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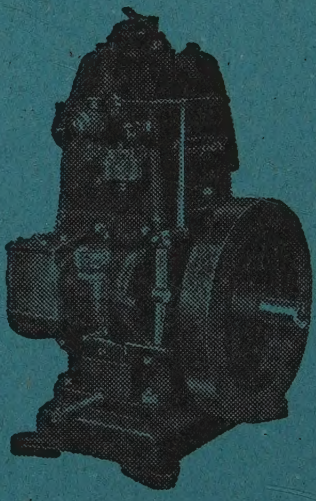

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Western Australia

JOURNAL

OF THE

DEPARTMENT OF AGRICULTURE

OF

WESTERN AUSTRALIA

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THE MINISTER FOR AGRICULTURE
Hon. G. B. WOOD

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JOURNAL

OF THE

Department of Agriculture

OF

WESTERN AUSTRALIA

Vol. 28. (Second Series) SEPTEMBER, 1951. No. 3.

Muscovy Ducks

By

R. H. MORRIS, Officer in Charge, Poultry Branch, and H. COLE, Poultry Instructor.

THE production of ducks for meat purposes can be quite a profitable venture providing the ducks are bred, managed and fed correctly. With good export markets offering for prime birds it is hoped that the information contained in this article will serve to increase the export of table poultry by assisting the farmer to produce Muscovy ducks on a profitable basis.

It is not a difficult matter to secure good weights in young ducks at market age but many underweight birds are marketed each year in Western Australia. It is the object of this article to encourage the growing of heavier ducklings by outlining improved methods of duck management, breeding and feeding.

There is a good overseas demand for all classes of Western Australian dressed poultry, including ducks at the present time, and this market seems assured for some time to come.

Muscovy ducks are the only ducks exported from Western Australia. During the 1949-50 financial year approximately 4,000 cases of dressed ducks valued at £26,000 were exported and in 1950-51, 3,000 cases valued at £21,000, were exported. In comparison the value of all table poultry exported from Western Australia during 1949-50 and 1950-51 was approximately £177,000, and £200,000 respectively.

Fig. 1.

Cases of ducks being held in cold storage prior to shipment. Approximately £25,000 worth of dressed ducks and drakes are exported from Western Australia annually.

The price for good quality drakes has not fallen below 1s. 4d. per lb. (12s. per bird live weight) during the past two years. At the present time the price is 2s. per lb. (18s. per bird) and during the past six months has averaged this figure. As with the marketing of any other form of primary produce only prime birds can be expected to realise top prices and it is not uncommon for inferior drakes to bring 4d. per lb. less than prime drakes in the same market.

Unless the farmer is prepared to take steps which will ensure the production of a large number of prime market birds from each mother duck per annum (this includes the selection of good stock in the first instance, correct management of same and correct feeding of the breeders and ducklings) the venture does not warrant further consideration.

The Muscovy is noted for its prolific breeding qualities and its ability to produce ducklings throughout the year. These are the two main features which make it the most popular breed of table duck throughout Australia.

In America and England Pekin ducks are farmed in large numbers. Pekins are noted for their white flesh and the small differences in weight between the sexes at marketable age. They are usually marketed at 11-12 weeks of age when they are known as "green" ducks, and at this age the drakelings weigh 8 lb. and the ducklings 7 lb. However, Pekins are not suited to Australian conditions and in Western Australia the breeding season for Pekins is limited and the fertility usually poor. The breeding season is usually limited to September to December inclusive and, although 30 to 40 eggs may be laid by a Pekin duck during these four months, probably only 15 or 20 of these eggs will hatch because of poor fertility. To encourage the duck to lay as many as 30 or 40 eggs the eggs must be collected when laid and hatched artificially. On the other hand a good Muscovy breeding duck in her first laying season should have little difficulty in producing 50 ducklings.

Muscovy drakelings are marketed at 16 weeks of age when they should weigh between nine and 10 lb. and the ducklings at 14 weeks of age when they should approach five lb. Extremely good specimens of drakelings will weigh just over 10 lb. at 16 weeks, and ducklings five and one half lb. at 14 weeks. It should be every breeder's ambition to attain these last mentioned weights.

THE ECONOMICS OF MUSCOVY DUCK KEEPING.

The two main factors which determine the profit that can be made from Muscovy ducks are—firstly the number of ducklings that each breeding duck produces each year, and secondly, the price per lb. received for the ducklings. Table 1 shows the approximate profit that can be expected over feeding costs, from each breeding duck per year, when these two factors vary. It is assumed that the ducklings weigh 4¾ lb. at 14 weeks and the drakelings 8¾ lb. at 16 weeks. Any duck grower should be able to obtain these weights in his ducklings, though adequate protein feeding to the growing birds and good size in the breeding stock are of course essential to the production of birds of these weights.

At the present time (March 1951) the price per lb. of a good growing ration is approximately 2.2d., and at this price it costs approximately 5s. 4d. to feed a bird from day old to market age, (average figure for ducklings and drakelings). In preparing Table 1 an allowance of 16s. has been made to feed the mother duck for one year.

Table 1.

No. of progeny marketed from each breeding duck per year.	Price per lb. Live weight received for progeny.						
	1/6	1/8	1/10	2/–	2/2	2/4	2/6
	£	£	£	£	£	£	£
20	4	5	6	7½	8½	9½	11
30	6½	8	10	11½	13½	15	16½
35	7½	9½	11½	13½	15½	17½	19½
40	9	11	13½	15½	18	20	22½
45	10	12½	15	17½	20	22½	25
50	11	14	17	19½	22½	25	28

Referring to Table 1 it will be seen that if a breeding duck produces 40 marketable progeny each year (and in practice this should be achieved) half of which are ducklings and the other half drakelings, and these birds realise 2s. per lb. live weight, then that breeding duck would return approximately £15 10s. over feeding costs for the 12 months. On this basis a flock of 24 breeding ducks and four breeding drakes would return approximately £370 per year over feeding costs.

THE ORIGIN OF THE MUSCOVY.

T. W. Burgin of Buenos Aires, Argentine, writing in "Practical Duck Keeping under Australian Conditions," describes the origin of the Muscovy duck as follows.

> The Argentine duck, "Pato Real", is of South American origin, and many authors believe it was introduced to Europe by Christopher Columbus, but it was certainly known in Europe in 1559, some 70 years later. From that time it has been domesticated and bred in some European countries. In Spain, it is known as the "Guinea" duck, the "Indian" or the "Mute" duck; the French named it "Canard de Barbarie"; in England and Australia it is called the Muscovy duck. The Incas of Peru bred this duck and called it "Nunuma", no doubt appreciating its good qualities. In the Argentine the duck is named "Pato Criollo".
>
> It is one of the largest ducks known; the average weight of the drake is just over 12 lb., but many reach 14 lb. and over. The duck, however, is less than half the weight of the drake, and it is a very large duck which attains 6½ lb., the average being about 5 lb. The adult drake is enormous—measuring frequently 32 to 34 in. in length; it walks slowly and heavily.

FLOCK BALANCE AND SELECTING BREEDING STOCK.

For best results it is important that the flock should consist of first, second and third season breeding ducks. One half of the ducks should be in their first laying season. First season ducks are naturally more prolific than second and third season birds, and the inclusion of a good proportion of young ducks in the flock will be a safeguard

against small clutches. On the other hand, the future of the flock must be ensured and a flock noted for large numbers of ducklings per clutch, and large body size of the progeny at market age is more likely to be maintained, if each year's breeding birds are produced from mothers that have been proved capable of hatching large numbers of quick developing, large bodied ducklings. It is recommended therefore, that the flock balance should be one-half first season ducks, one-third second season ducks and one-sixth third season ducks. The second season ducks provide the future breeding ducks and the third season ducks the future breeding drakes.

To maintain the recommended flock balance the following culling programme should be adopted.

Culling Programme.

First Year.

Flock of 12 breeding ducks comprising :

Six first season birds (See "Second Year" 2nd Column)	Four second season birds (See "Second Year" 3rd Column)	Two third season birds (Both culled at end of season.)

Second Year.

Six replacement first season ducks, progeny of which are all marketed.	Four second season ducks retained for supplying future breeding ducks. Remaining two ducks culled because of small egg size, poor rearability, bad sitters, few eggs to a clutch, etc.	Two best ducks retained for supplying future breeding drakes and perhaps ducks.

Culling in this way ensures that only the best ducks are used to perpetuate the strain.

The period each year for hatching the future breeding ducks and breeding drakes is limited and is confined to August and early September, which means that the selection of breeders is made from the first clutch hatched from second and third season ducks after their respective moulting periods. It rarely pays to keep a breeding duck for more than three seasons.

The first, second and third season ducks should be mated to first season drakes, i.e., the drakes should be 8½ months old at the beginning of April when the breeding season commences.

Advantages of Using Young Drakes.

The aim in breeding Muscovy Ducks is to produce as many heavy weight ducklings as possible each year and this can be achieved without using old drakes providing the young drakes that are selected for breeding purposes are well developed. Young drakes are vigorous and are more likely to give good fertility than older birds, also the three months moulting period that old drakes experience each year during April, May, June when they rarely mate is avoided by using young drakes. A young drake if hatched in August will work continuously from the time he is eight months old until he experiences his first moult when 19 months of age.

If only young drakes are used in the breeding pen and particularly if they have been reared together, fighting should not occur and good fertility can, as a consequence, be expected. It is not unusual in a flock where both young and old drakes are used to see the young drakes banished from the ducks by the old drakes early in the mating season and the opposite state of affairs existing later in the season when the young drakes become thoroughly mature.

To Avoid Infertility.

Should it be decided to keep a very superior breeding drake for two seasons for the purpose of producing future breeders, a young drake should be utilised during the three months moulting period to avoid infertility during this time. The young drake can then be replaced by the old drake when the latter recommences to work, in July.

Selecting Breeding Drakes.

Size is of paramount importance in selecting the breeding drake. Breeding drakes should be hatched in August from eggs laid by third season ducks and the selection should be made when the drakes are 16 weeks of age (mid December). Drakes are usually marketed at this age and the biggest and most robust drake in the pen at this time would be the logical choice. There are usually one or two drakes in each clutch that show outstanding development and when they reach the age of 12 weeks an idea will be gained as to the ones most likely to be suitable as breeders.

In addition to coming from a high egg producing strain and being bred from a duck which is noted for her ability to produce large clutches, the breeding drake should conform to the following requirements:

(1) Big body size—long and broad in the back with a deep body.

(2) Short thick legs.

(3) Weight not less than 10 lb. at 16 weeks and not less than 11½ lb. at eight months.

If the selection is made when the drakes are 16 weeks of age the balance of the drakes can be marketed at the correct time. If a drake is inferior when he is 16 weeks old, it is unlikely that he will develop into a satisfactory breeding drake. There is nothing to be gained therefore, by leaving the selection until the drakes are 20 weeks of age as is sometimes practised.

In order to maintain hatchability and rearability, it is necessary to introduce new blood each second or third season. This is usually done through the drake. When acquiring new stock, one cannot be too careful about the stock introduced. Care should be taken to see that the imported drake is well developed, hatched in mid August, and that he is from an egg laid by a third season duck. These requirements limit the number of first-class drakes available each year and as a consequence it is not always possible to buy a drake with these

GROWTH IN DUCKLINGS.

(a)

(b)

(c)

Fig. 2.

(a) Five days. (b) Eight days. (c) Two weeks.

GROWTH IN DUCKLINGS.

Fig 3.
(a) Four weeks. (b) Seven weeks. (c) Eight weeks.

GROWTH IN DUCKLINGS.

(a)

(b)

(c)

Fig. 4

(a) Nine weeks. (b) Eleven weeks. (c) Mixed group, 12-15 weeks.
Note (c) Fig. 4.—(1) The bird in the bottom left hand corner is a 12-week-old *duck* with flight feathers just beginning to cross. (2) The bird immediately to the right of the 12-week-old duck is a 12-week-old *drake*: the flight feathers have not yet appeared. (3) The bird in the bottom right hand corner with the flight feathers just beginning to cross is a 15-week-old *drake*.

DUCKLING.

6 weeks old

8½ weeks old

14 weeks old

Fig. 5.

DRAKELING.

6 weeks old

8½ weeks old

14 weeks old

Fig. 6.

To give some idea of the weights that should be obtained by ducklings and drakelings at 6, 8½ and 14 weeks of age respectively the two series of photographs are given in Figs. 5 and 6. These birds were fed a 16½ per cent. protein mash from day old until they were marketed at 14 and 16 weeks respectively.

The drake weighed 9 lb. at 16 weeks of age. However, it is possible for drakes to weigh slightly more than 10 lb. at 16 weeks so that 9 lb. should not be too much to expect.

Fig. 7.

FIRST CLASS BIRDS.

There should be more of this sort of thing. A drake and a duck selected from the flock shown in Fig. 30 weigh 10 lb. and 5½ lb. respectively. Both are only 14 weeks of age.

(a)

(b)

(c)

Fig. 8.

DESIRABLE FEATURES IN A BREEDING DUCK.

The same breeding duck is to be seen in (a) and (c) and on the left side of (b). This particularly good type of breeding duck weighs 7¼ lb. and no breeding duck should weigh less than 6lb. at the beginning of the breeding season. With such excellent body conformation it is not surprising that this bird weighs more than 7 lb. Note the deep rectangular shaped body, full abdomen and broad back.

qualifications. However, if the farmer has a first-class drake to exchange, good stock can very often be obtained by this means. If you expect to secure a good specimen of a drake you should be prepared to offer a good one in exchange, and this necessitates breeding from third year ducks.

The future breeding drakes can be run with the future breeding ducks from December to April. When the old drakes moult in April they are marketed together with one half of the ducks with which they are mated. The young ducks and drakes can then be transferred to the breeding pen where the best of the original ducks remain. (See culling programme, page 217.)

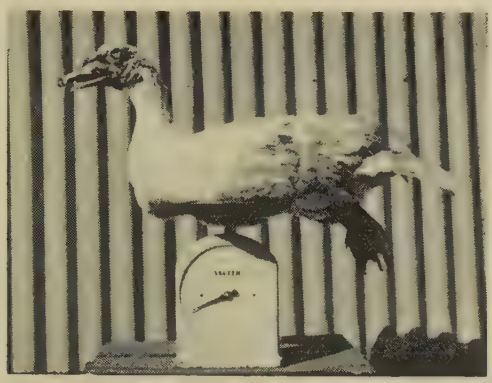
Fig. 9.

A breeding duck at the beginning of the breeding season should weigh at least 6 lb.

Selection of Breeding Ducks.

The breeding ducks are selected when they are 14 weeks of age from ducklings hatched in late August or early September. When selecting breeding ducks the same points should be observed as when selecting drakes, with the exception of weight, which for a 14 week old duck should be not less than 5½ lb. As with the drake, it is important that the ducks should come from a high egg-producing strain as strains of ducks which lay only a small number of eggs (10-12) to a clutch, are uneconomical. The breeding drake and the breeding duck should both be bred from a mother duck which averages in her second and third season, three clutches per year marketed and at least 15 ducklings to each clutch.

(a)



(b)

(c)

Fig. 10.

Figs. 10, 11, 12, and 13 illustrate the desirable and undesirable features of breeding drakes.

(a), (b) and (c) of Fig. 10 are of an "Old Man" drake weighing 14¼ lb. and show characteristics associated with an outstanding breeding drake. Apart from the weight which is a very good recommendation in itself, this drake possesses a long, deep, broad body and has short thick legs placed wide apart. This drake is an aged one and it is more usual for a good breeding drake in his first or second breeding season to weigh in the vicinity of 12 lb.

The quality of Muscovy Ducks in Western Australia varies considerably and it would appear that a good deal more care could be taken by many engaged in duck farming in this State in the selection of breeding stock. Some very good strains are available and those contemplating raising ducks are strongly advised to purchase only good foundation stock, as this first step will have a big influence on the degree of success ultimately achieved.

Laying and Hatching Programme.

The following is a fairly typical outline of the laying and hatching programme which a duck could be expected to follow during her first, second and third breeding seasons.

First Season.—Assuming the first egg laid in mid April when the duck is 7½ months old, the last egg of the first clutch could be laid during the second week in May. The eggs comprising this clutch would be small and to avoid hatching small ducklings the eggs should be collected as laid, and marketed.

After a rest period of about 10 days the first egg of the second clutch could be expected on or about 22nd May. Eighteen eggs could be laid by 12th June and the first ducklings could hatch on 17th July. Sixteen ducklings could be expected from 18 eggs laid.

Fig. 11.

The drake depicted in Figures 11 and 12 is a good specimen of a breeding drake and is mated to first class breeding ducks (note large bodies and short legs of all the birds that appear in this group—Figure 12).

These ducklings should be artificially brooded and after a rest period of one month the duck could lay the first egg of the third clutch on 17th August. Twenty-three eggs may be laid from 17th August to 11th September. The duck sits for 35 days and hatches on the 15th October. (The incubation period for other breeds of ducks is 28 days.) Twenty ducklings could be expected from the 23 eggs, and the ducklings would require artificial brooding.

The duck, after another rest period for one month, should commence laying her fourth clutch of eggs on or about 15th November. After laying 20 eggs in 25 days she would sit on 10th December and

the eggs would hatch on 14th January. Because of the hot conditions at this time of the year, some of the eggs may go bad during the incubation period (this is most likely to happen when the laying shed is not shaded) and only 15 ducklings could be expected from the 20 eggs laid. These ducklings would not require artificial brooding but should be provided with good warm sleeping quarters.

Fig. 12.

Fig. 13.

The "racy" type of drake with a light frame and long legs as shown in Figure 13 would be most unsuitable as a breeding drake.

After one month's rest the duck could lay the first egg of the fifth clutch on 14th February and probably only 15 eggs would be laid during the next 19 days. The duck sits on 5th March and hatches on 9th April. Ten ducklings could be expected from this hatch.

During the season, the duck would have laid 76 eggs in four clutches with an average of 19 eggs to a clutch and 15 ducklings hatched. This estimate does not include the eggs in the first clutch which should always be marketed because of their small size, as should any small eggs that might be laid at odd times through the year.

It should be possible to market 45-50 ducklings from a first season duck during 12 months.

Second Season Duck.—As soon as the first season duck hatches her fourth clutch on 9th April, she will probably moult, and remain in this condition until about the first week in July. A good duck should be back into production by 7th July. She could be expected to lay 12 eggs in 18 days and on 25th July, would sit for 35 days, hatching on 29th August. Ten ducklings could be expected from the 12 eggs and from these ducklings would be selected next season's breeding ducks. These ducklings should be of particularly good quality as they would have been bred from a duck that warranted retention for a second season's lay and would be from the first hatch after the duck has had a three months rest period. The ducklings would be selected when they were 14 weeks of age (mid December) and would lay their first egg in early April the following year, when they would be 7½ months of age. These ducklings would require artificial brooding as they would be hatched in a cold month of the year.

Assuming a rest period of one month, the duck would be back into production by 29th September, and in 22 days she should lay 19 eggs so that by 21st October, she would commence sitting on her second clutch for the season and this clutch would hatch on 25th November. Eighteen ducklings could be expected from the 19 eggs, and they would not require artificial brooding. The duck would recommence laying on 25th December, lay 15 eggs in 20 days by 14th January, and hatch 12 ducklings on 18th February.

During her second season the duck would have three clutches of ducklings with an average of 13 ducklings to a clutch from 15 eggs laid.

Third Season Duck.—The mother duck would probably moult at this time and recommence laying in mid June. The ducklings from her first clutch would hatch about the second week in August and from these ducklings would be selected next season's breeding drakes. As only the very best ducks would be retained for a third laying season, it can be assumed that these ducks are most likely to produce the best progeny and in addition to providing excellent breeding drakes, there is no reason why future breeding ducks should not be selected from the first hatch of a third season duck, especially if the ducklings are hatched not later than the end of August. The third season duck will hatch about the same number of ducklings as a second season duck, i.e., 39 ducklings from 45 eggs laid or an average of 13 ducklings and 15 eggs to each clutch.

There is generally a marked reduction in numbers of eggs laid per season after a duck has had three breeding seasons, and because of this, it rarely pays to keep a breeding duck for more than three seasons.

Flock Mating v. Single Mating.

Both systems of mating are used in Western Australia. Single mating implies the mating of a drake and six ducks, and these are housed as a unit. With flock mating, each drake is allowed six ducks but the drakes and ducks all run together, the size of the flock being dependent on the size of the laying house.

The writers prefer flock mating as with this type of mating, less infertility is likely to be experienced.

Fig. 14.

Flock mating on a big scale. Here a nice flock of Muscovy ducks is running on a pasture comprised mainly of kikuyu grass and paspalum. This pasture remains green for the greater part of the year and provides ideal conditions for flock mating.

REARING DUCKLINGS.

Utilise Artificial Brooders when Possible.

In Western Australia there are only six months of the year (April-September inclusive) apart from odd cold spells when ducklings require warmth over and above that which they generate for themselves. For the remainder of the year the ducklings will keep themselves warm provided they are given a warm box in which to shelter (see page 238). During April to September inclusive, how-

ever, extra warmth is required during the first three or four weeks and this can be provided either through an artificial brooder or by utilising the mother duck.

Economical duck raising necessitates the raising of as many ducklings as possible each season. The use of an artificial brooder will help in this regard and is recommended where large numbers of ducklings are hatched at any one time. If the ducklings are taken from the mother when they are about 24 hours old, the

Fig. 15.
A nice flock of ducks just ready for market.

mother duck will come back into production in one month, whereas if no attempt is made to separate the mother from the ducklings, she may remain with them, and out of production, for any period up to three months. Even the use of a mother duck as a brooder for only three weeks is to be avoided if possible. When, however, only a few (up to 25) ducklings hatch at any one time it is not economical to run a brooder. One duck can quite successfully brood up to 25 ducklings during the cold months of the year and should two ducks hatch within two or three days of each other, all the ducklings can be given to one mother. The extra ducklings should be placed under the mother at night. It is not necessary for the mother to be with the ducklings for more than three weeks provided warm sleeping quarters are provided from this time onwards.

When a brooder is used, one "100 chick size" brooder will accommodate 50 ducklings. Conditions similar to those given to chickens should be provided. The temperature should remain at 95°F. for the first week and should be reduced 5°F. each week until the

Fig. 16.

The centre bird in Fig. 16 is the same drake that appears in (a) Fig. 17. The crossed flight feathers at a point half way down the tail feathers are typical of a 16 weeks old drake ready for market.

The two drakes at either end of the group are 14 weeks of age and show the tips of the flight feathers just showing.

It will be seen that at 14 weeks the tips of the flight feathers do not reach even to the base of the tail feathers. Between the 14th and 16th week a drake's flight feathers grow very quickly and are "sappy," i.e. the quill is soft and contains a pink jelly-like substance. At 16 weeks, however, the quill is hard and clear and when pulled from the wing, comes away cleanly.

fourth week when the brooder can be dispensed with. The behaviour of the ducklings should be closely observed as this will be the best guide as to their temperature requirements. It is interesting to note that ducklings are being reared quite successfully in this State using infra red ray lamps. With this method of brooding, dry jarrah sawdust to a depth of 6 in. should be supplied as litter.

When either natural or artificial brooding is used, at least 3 in. of bone dry litter should cover the cement floor. Perfectly dry jarrah sawdust (and this excludes green sawdust) will be found satisfactory as litter. Under no circumstances should the litter be allowed to become damp, as dampness invariably leads to chills and leg weakness and predisposes the ducklings to "wet eye."

The ducklings should be confined to within 18 in. from the edge of the brooder for the first three days. A circle of flat iron around the brooder and about 12 in. in height is usually used for this purpose. After three days, the ducklings can have access to the whole floor space of the brooder compartment. Depending on the weather, they can be allowed out in the run in a confined area (approximately 8 ft. x 8 ft.) when they are 10 days old. More running space can be given as required.

Fig. 17.

MARKET YOUR BIRDS AT THE RIGHT AGE.

When the exact age of a bird approaching market age is not known, the condition of the face and wing feathers will serve as a guide in determining its age.

The face of a 16 weeks old drake will show a loss of feathers and red skin around the eyes and beak with a band of feathers extending between the two bare, red areas. So long as this band of feathers remains the bird is not termed a "Red Head" and can be expected to bring top market price. The 16 weeks old drake in (a) above is in ideal market condition. The drake on the left of (b) is 18 weeks old and a definite "Red Head." His flesh is worth less per lb. than that of the drake in (a).

The drake on the right of (b) is 14 weeks old and has not yet started to lose the face feathers.

Fig. 18.

Pictured here are 80 ducklings under a "150 chick size" brooder. Wherever possible an artificial brooder should be used during the winter months as this practice enables the breeding ducks to fulfil more completely those all-important functions of laying the maximum number of eggs and hatching as many ducklings as possible during the year.

During the four weeks in which the ducklings are under the brooder the brooder will accommodate half the number of ducklings that the manufacturer claims its chicken capacity to be, so that in this instance the brooder is stocked to capacity. It is not always essential to have a mother duck with the ducklings, but the mother duck sometimes affords the ducklings protection against rats, cats, hawks and crows.

Note the 4 in. to 6 in. depth of dry jarrah shavings which cover the floor of the compartment. These provide excellent litter. Ducklings do not scratch like chickens and as the litter becomes caked on top so that layer is removed and replaced with clean material.

Fig. 19.

A waste of one mother duck (see Text page 232).

HOUSING.

One of the advantages with duck raising is that ducks do not require elaborate shedding. However, the houses should have good ventilation, and cement floors are essential from the point of view of hygiene and to keep the birds free from stickfast fleas. As with other poultry, ducks will become heavily infested with stickfast fleas unless appropriate steps are taken to safeguard the birds against this pest. The only effective means of dealing with this pest is to equip the duck houses with impervious floors, preferably of concrete.

Ducks spend a good deal of their time in the open and are most likely to do well on well drained sandy soil. It is important that they should be able to take refuge in dry draught proof quarters when it rains. The provision of ample shade in the yards and also over the sheds themselves during summer is essential for good results.

The large rearing shed and laying shed mentioned below are simple in construction and because of the shortage of building materials have been kept to a minimum height. Of the three types of sheds given (see (a), (b) and (c), pages 237-243 inclusive) the large rearing shed would predominate on a duck farm. In addition to being suitable for housing growing ducks, the large rearing sheds would also be suitable for housing 100 growing pullets from the six week to the 20 week old stage.

Fig. 20.

This small rearing pen is 4 ft. square and will house up to 50 ducklings during the summer and a mother and 25 ducklings during the winter until they are three or four weeks of age. It faces East and is protected from the South-West and North-West by a thicket of scrub. Ducks appreciate protection which is afforded by a thicket such as this. When the shed is in use a 5 ft. sheet of corrugated iron is placed at the foot of the two 9 ft. sheets. This shed is described on page 237.

The photograph also shows a small breeding flock (12 ducks and two drakes) of good type Muscovy ducks. Note the short legs and the large deep bodies of the ducks. The drakes which also have these characteristics unfortunately cannot be too clearly seen. The annual return over feeding costs from a flock of this size should be in the vicinity of £180.

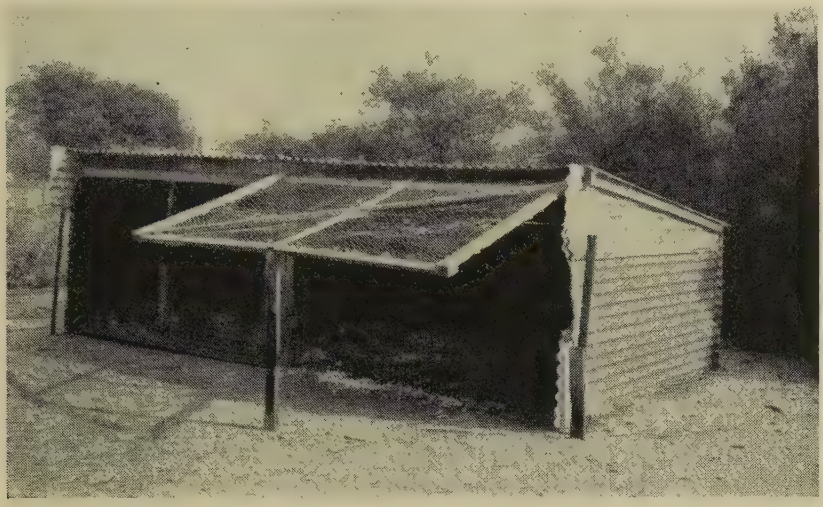


Fig. 21.

One of the advantages of duck rearing is that ducks do not require very elaborate housing. The house must, however, be dry at all times.

This particular laying shed is 13 ft. 6 in. long by 8 ft. wide, 5 ft. high at the front and 3 ft. 6 in. high at the back. It is a converted cockerel marketing pen, hence the drop down wire gate to facilitate catching. Ducks are best caught by hand in the corner of the yard with the assistance of two hurdles. Two wooden frames each 6 ft. long and 3 ft. 6 in. high with wire netting stretched over them, make suitable hurdles.

The shed is built on well drained sandy soil and has a concrete floor which is one inch above ground level. The sides and back are of corrugated iron and the iron is sunk 3 in. in the ground to prevent water from entering the shed.

A shed this size will provide sufficient nesting room (20 nests) for 30 breeding ducks. The nests can just be seen arranged along the back wall of the shed. A section of them is more clearly shown in Figure 26.

This shed faces East (all sheds should face in an easterly direction) and when 30 ducks utilised this shed as a laying shed a single row of nests facing towards the centre of the shed was arranged along the full length of the West and North walls of the shed and along the rear half of the South wall. (The front half of the South wall could not be utilised without a sun screen being built in the South-East corner of the shed, as the morning sun shines on this section of the floor.).

To guard against extremes in temperature it was found necessary to have an air gap of 4 in. between the wall and the nests along the North wall. The sun naturally falls on the North wall for most of the day and poor hatchability was obtained from the eggs in these nests until a baffle board was installed which kept the backs of the nests 4 in. away from the North wall. This would not be necessary of course if the laying shed was built in the shade, and the conditions in this shed would be greatly improved if the shed was bathed in dense shade during the summer (see Figure 22). It is little points in management such as this that determine the amount of profit or loss that duck farming returns.

(a) Small Rearing Shed.

During the summer months the ducklings can be taken from the mother as soon as they are completely dried off (about 24 hours after hatching). The day old ducklings (as many as 50) can be placed in a small warm house, as shown in figure 20. The dimensions of this house are:—

Width 4 ft., depth 4 ft., height in front 3 ft. 6 in., height at back, 2 ft. 9 in.

Materials Required for Construction.

Timber (Jarrah).

Front Posts.—Two 5 ft. 6 in. lengths of 3 in. x 2 in. (allowing 2 ft. in the ground).

Back Posts.—Two 4 ft. 9 in. lengths of 3 in. x 2 in.

Top wall plates.—Seventeen feet of 3 in. x 1½ in.

Cement Box.—Seventeen feet of 6 in. x 1 in.

Corrugated Iron.

Roof.—Two sheets of 5 ft. corrugated iron (6 in. overhang front and back).

Back.—One sheet of 6 ft. corrugated iron (cut in two and iron sunk 3 in. into ground).

Sides.—Two sheets of 7 ft. corrugated iron (cut in two and iron sunk 3 in. into ground).

Fig. 22.

A breeding pen of ducks under ideal summer conditions. The photograph was taken in February and the well shaded laying shed is conducive to good hatches. The deciduous trees (flame trees) allow the sunlight to gain entry to the run during the winter.

Attached Run.—Two 9 ft. sheets of corrugated iron for the two sides of the run and one 5 ft. sheet across the end to prevent draughts.

Shed Fittings.—The shed has a concrete floor and this is covered with 3 in. of dry wood shavings, or sawdust. A small box the size of a fruit case, on its side, covered to prevent draughts with the cover extending over the front to within approximately two inches of the top of the litter, is placed in one of the rear corners of the shed to

Fig. 23.

All classes of poultry appreciate fresh ground and ducks are no exception. This photograph shows a duck run with a young crop of barley ready to receive ducklings from the brooder house.

provide extra protection for the ducklings. The box rests on the concrete floor and has in it litter to a depth of approximately 3in. The opening to the box should face the rear wall of the shed and be approximately 1 ft. from the rear wall. The ducklings sleep in the box and the litter in the box must always be kept dry and clean.

During the cold months of the year when a mother duck accompanies the ducklings for the first three weeks, this small shed will accommodate 25 ducklings, but during the warmer months a mother duck is not required and 50 ducklings can be placed in the shed together.

The ducklings are confined in the 4 ft. x 4 ft. shed for four days until they become strong on their legs. They can then have the use of the run.

Care should always be taken to see that the concrete floor is perfectly dry and ample litter, preferably perfectly dry sawdust or wood shavings should cover the whole floor area of the shed to a depth of 3 in. The litter should be removed at the slightest sign of dampness. It is usually not necessary to remove the litter for the first week, except in the little sleeping compartment and this should be cleaned out daily. As soon as the ducklings begin to eat and drink in quantity however, the litter over the whole surface of the house will become damp and this should be renewed frequently.

The shed described above will accommodate the ducklings until they are three weeks old. They should then be removed to a larger house and run similar to that described below, where they can remain until they are marketed.

(b) Large Rearing Shed.

A shed suitable for holding 50 ducklings (3 to 16 weeks old) would have the following dimensions—Length 9 ft., depth 6 ft. It should be 5 ft. high in the front and 4 ft. high at the back. The roof should overhang 6 in. in front and 4 in. at the back.

Fig. 24.

The types of nests illustrated in Figure 24 cannot be too strongly condemned. A kerosene case on its side placed over a saucer shaped depression in the ground does not ensure that the eggs are kept close in under the sitting duck at all times, and in cold weather an embryo will quickly die in an egg that is exposed for only a short time.

The spacious nest in the foreground is not conducive to good hatchability for the same reason given above. Also, two ducks would have little trouble in sharing this nest and even if they did not fight and break the eggs the chances of the eggs becoming chilled are considerably increased.

The sun should never shine directly on to the nest as it does in this instance, neither should the eggs be allowed to become wet with rain. Both factors will kill the embryos.

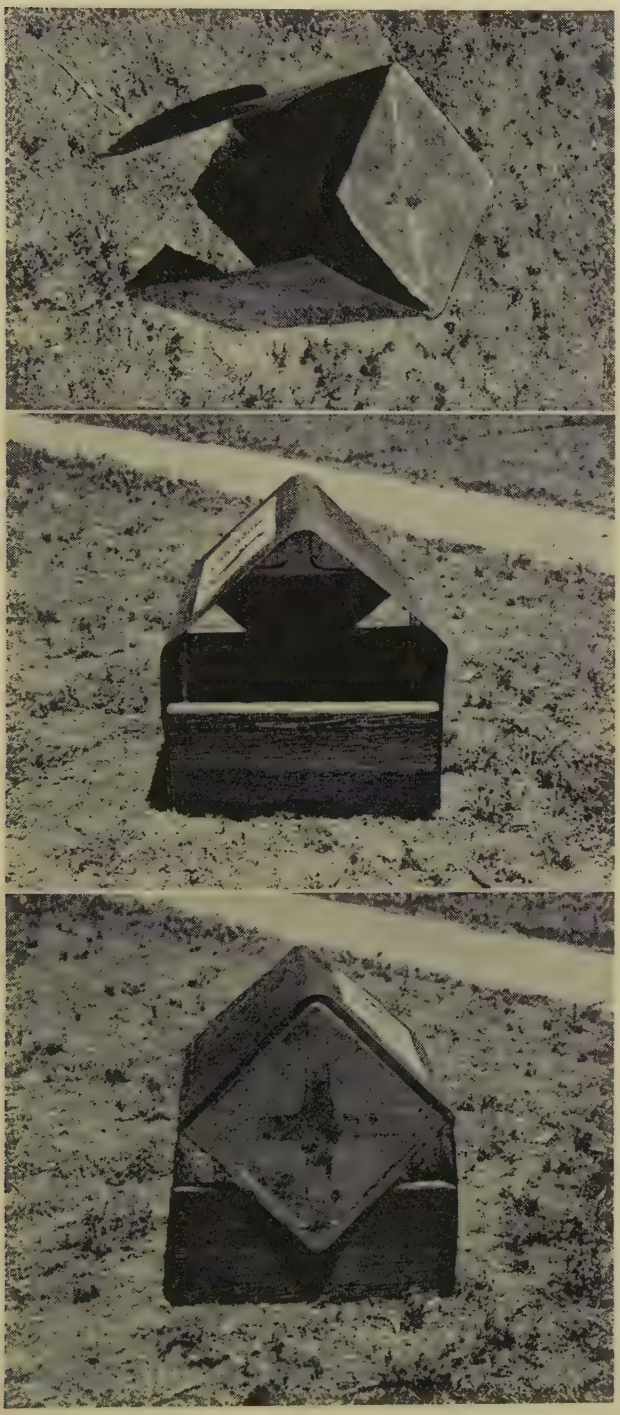
Materials Required for Building a House of These Dimensions.

Flat Asbestos and Corrugated Iron.

Roof.—Five 7 ft. sheets of corrugated iron.

Sides.—Four sheets of 5 ft. x 3 ft. flat asbestos (buried 6 in. in the ground).

Front.—One sheet of 9 ft. x 3 ft. flat asbestos. (This will cover the bottom portion of the door which is 2 ft. 6 in. wide.)



(a)

(a), (b) and (c), illustrate the method adopted in the construction of a neat practical nest, using a kerosene tin and two lengths of 6 in. x 1 in. board, each 13 in. long. After nailing the two boards into position the nest is placed on the cement floor of the laying shed and 3in. of sawdust or wood shavings are placed in the bottom. After each clutch is hatched the nest is lifted away, the shavings and feathers removed and clean shavings provided.

(b)

The advantages of this type of nest are:—

(1) The nest is small enough to prevent the eggs from spreading and from being pushed from under the duck. There is little risk of the eggs becoming chilled, and therefore, more likelihood of a good hatch. This factor of chilled eggs is a very important one. Many fertile eggs never hatch because they become chilled at some stage in the incubation period (in this respect the first few weeks of incubation are the most important) and waste such as this, when it can be so easily avoided should not be tolerated. One duck can satisfactorily cover up to 25 eggs in a nest of this size.

(2) The nest will only accommodate one duck. This eliminates fighting and accompanying losses through broken and chilled eggs.

(c)

Fig. 25.

Fig. 26.

The recommended type of nest in use.

Note the wood shavings in the nest to a depth of 3 in. The wood shavings and feathers from the sitting duck make excellent nesting material. Two nests should be allowed to every three breeding ducks.

Back.—Three sheets of 4 ft. 6 in. x 3 ft. flat asbestos (buried 6 in. in the ground).

Cement Floor.—The shed should be provided with a cement floor and perfectly dry jarrah sawdust or wood shavings should cover it to a depth of 3 in. The litter should be kept clean and dry at all times.

Timber (Jarrah).

Side Posts.—Two 7 ft. lengths of 3 in. x 2 in.

Back Posts.—Four 6 ft. lengths of 3 in. x 2 in. (This allows 2 ft. in the ground.)

Front Posts.—Four 7 ft. lengths of 3 in. x 2 in. (allowing 2 ft. in the ground).

Top wall plates.—

(a) *Back and Front.*—Two 9 ft. lengths of 3 in. x 1½ in.

(b) *Sides.*—Two 6 ft. lengths of 3 in. x 1 in. (Let into posts 1 in. to carry asbestos.)

Front Trimmer for Asbestos.—One 6 ft. 6 in. length of 3 in. x 1 in. (Let into front posts 1 in. to carry asbestos.)

Cement Box.—A 6 in. x 1 in. board is required all round the base to act as a cement box (two boards 9 ft. long and two boards 6 ft. long). This timber should be let into the posts 1 in. to provide a flat surface to the asbestos.

Door.—Two 5 ft. and three 2 ft. 6 in. lengths of 3 in. x 1 in. (halved joints to provide a flat surface for the asbestos).

Wire Netting for Front including top 2 feet of Door.

One piece 9 ft. long x 2 ft. wide.

The shed should be provided with a run which measures approximately 8 yards wide x 12 yards long. Ample shade should be provided in the run.

After ducklings are three weeks old it is possible to mix different age groups, but not more than three weeks should separate their ages as the younger ducks will not be given the opportunity of developing properly and may have their feathers plucked by the older birds. In this way, cannibalism may become a real problem.

(c) Laying Shed.

A laying shed suitable for 30 breeding ducks and containing 20 nests could have the following dimensions—length 15 ft. 6 in., breadth 8 ft., height in front 5 ft., height at back 3 ft. 6 in. The roof should overhang 6 in. at the back and 1 ft. in the front.

The materials required to construct this shed (the one in Fig. 21) are as follow:—

Timber (Jarrah).

Front Posts.—Three 7 ft. lengths of 3 in. x 2 in.

Back Posts.—Three 5 ft. lengths of 3 in. x 2 in.

Top Wall Plates—Sides.—Two 8 ft. lengths of 3 in. x 2 in.

Top Wall Plates—Front and Back.—Two 15 ft. 6 in. lengths of 3 in. x 2 in.

Box for Cement Floor.—Forty-eight feet of 6 in. x 1 in.

Corrugated Iron.

Roof.—Sixteen 5 ft. sheets. (This allows for a 4 in. overlap, 6 in. overhang at the back and 1 ft. 2 in. overhang in front.)

Sides.—Five 8 ft. sheets ($2\frac{1}{2}$ sheets for each side).

Back.—Four 8 ft. sheets.

If necessary, flat asbestos could be substituted for corrugated iron on the sides and back. When flat asbestos is used extra studs would be required and these should be no more than 2 ft. apart.

FEEDING.

Feeding Ducklings.

The age at which ducklings can be marketed and the weights which they attain is determined largely by the feeding they receive.

It should be the aim of every producer of Muscovy ducks to market the male birds when they are 16 weeks old and the females when 14 weeks.

Male birds at 16 weeks should average at least $8\frac{3}{4}$ lb. and females at 14 weeks at least $4\frac{3}{4}$ lb.

The most important ingredient in the ration governing the age and weight of the birds when marketed is protein, a nutrient which has been shown in departmental leaflet No. 995 to be so fundamentally important in feeding the domestic fowl.

Unfortunately the importance of feeding adequate levels of protein rich foods is not fully appreciated by many engaged in poultry production in this State and duck keepers are no exception.

For optimum results from table ducks, quick continuous growth is required and this demands a ration which contains sufficient animal protein, which in other words means an adequate level of meatmeal.

Ducklings will not grow satisfactorily if fed on bran and pollard alone. Small amounts of meatmeal when added to a bran and pollard mash will result in improved growth rates but it is not until the ration contains a good level of meatmeal and in the vicinity of 16-17 per cent. of protein that really satisfactory results will be obtained. It will be seen from the following mashes that this level of protein can only be obtained by supplementing the protein from vegetable sources with adequate protein from animal sources, examples of which are meatmeal and buttermilk powder.

Fig. 27.

THE RESULT OF MALNUTRITION.

Two 17-week-old drakes weighing only 5½ lb. each. (They should weigh 10 lb. each.)

Cause.—They were fed a ration deficient in protein, minerals and vitamins. One cannot expect satisfactory growth in ducklings that are fed bran and pollard only. These "humped back" birds have the frame but there is very little flesh on that frame. One of the birds is so weak through malnutrition that it cannot stand.

TABLE 2.

* ALL MASH RATIONS FOR DUCKLINGS 1 TO 16 WEEKS OLD.

Ration.	1	2	3	4	5	6	7	8	9
Bran	36	36	30	24	12	24	24	36	40
Pollard	60	10	20	30	20	30	40	40	40
Wheatmeal	....	22	40	32	48	32	10	10	....
Gristed Oats	....	10	....	....	10	10	....	10	....
Meatmeal	12	12	15	14	18	16	11	14	9
Sterilised Bonemeal	3	2¾	3	3	3	3¼	3	3¼	2¾
Total	111	92¾	108	103	111	115¼	98	113¼	91¾

* Whole grain should not be fed with these mashes.

It is advantageous to include buttermilk powder in the mash, and when buttermilk is available, 4 lb. can replace 3 lb. of meatmeal in each of the rations listed in Table 2 (i.e., Ration 1 would then read:—Bran, 36 lb.; pollard, 60 lb.; meatmeal, 9 lb.; buttermilk powder, 4 lb.; bonemeal 3 lb.) It is assumed that the meatmeal contains 50 per cent. of protein. Should the meatmeal contain only 40 per cent. of protein use 5 lb. instead of every 4 lb. given in Table 2.

Quick growing ducklings require minerals for bone development and unless a mineral-rich foodstuff like bonemeal is fed, the ducklings may "go in the legs." The bones throughout the body will be poorly mineralised and the ducklings will be unable to stand as their weak legs will be unable to support their bodies. When well grown ducklings that are apparently healthy in every other respect, lose the use of their legs, a deficiency of bonemeal in the ration is probably the cause. At the same time it must not be forgotten that ducklings suffering with a vitamin A deficiency very often lose the use of their legs, but in this case, it is usual also for other symptoms to to be shown.

The rations given in this article for ducks of various ages contain sufficient of all known nutrients required for optimum results.

One of the mashes listed in Table 2 should be fed as an *all mash* diet from day old until the birds are marketed at 14 or 16 weeks depending on their sex. This Department does not recommend for very young ducklings a mash which is completely devoid of meatmeal or which only contains a small amount of meatmeal. Neither does it advocate a fattening (low protein) mash for the two weeks immediately prior to slaughter. Good growth is required until the birds are marketed and this growth demands adequate protein.

Feeding Breeding Ducks.

The rations listed in Table 2 with the following adjustments made would be suitable for feeding to breeding ducks.

1. Reduce the meatmeal by 2 lb. in each case.
2. For every pound, or part of a pound of bonemeal given, add an equal amount of oyster flour, e.g., in the case of Ration 2, $2\frac{3}{4}$ lb. *each* of bonemeal and oyster flour would be provided.
3. If buttermilk powder is not used, add "Ribon" to the mash at the strength recommended for breeding hens by the manufacturer, to ensure good hatchability. This is most important.

Whereas a ration which contains a relatively large amount of fine material like pollard (e.g., Ration 1) is suitable when fed as a wet mash, a more open textured mash like Ration 4 would be more suitable for feeding in the dry form.

Method of Feeding.

Many successful poultry farmers in Western Australia realise the beneficial results that are obtained when dry mash provides all

Fig. 28.

Duck carcases—all 14 weeks of age when slaughtered but what a comparison in size and value!

The carcase on the left weighs 3¼ lb., is poorly finished and badly bruised and torn on the back. It is in no way suitable for export.

The centre carcase is a good type export duck weighing 4¼ lb. (live weight approximately 4¾ lb.). Note well fleshed body (see also Figure 29).

The inferior carcase on the right weighs 3 lb. (see also Fig. 29) and is typical of a duck that has been poorly fed. There is no future for this class of bird.

or part of the fowl's food intake. The value of dry mash in producing heavy weight ducklings at market age is however, not so universally appreciated.

Some farmers prefer to feed their ducks two wet mashes every day and these are usually fed at 8 a.m. and 4 p.m. respectively. The feeding of two wet mashes per day without provision for dry mash is not always successful in that it is not always possible to accurately guage the ducklings food requirements, and this method of feeding can result in the ducklings being underfed, or in the food being left and becoming sour if too much wet mash is fed at any one time. This latter possibility is most likely to occur during the summer.

Maximum food consumption of a balanced ration will result in the most economical production of Muscovy ducklings and dry mash will help in achieving this. Adequate feeding space from the dry mash feeders must be provided, and the feeders should be open at all times, as ducks feed by night as well as by day.

Results will be just as satisfactory if one wet mash is fed in the morning and the ducks are allowed to obtain the balance of their food requirements from dry mash feeders. The latter method of feeding is less arduous than the former, and, as equally satisfactory results are obtained, the wet and dry mash method of feeding is recommended.

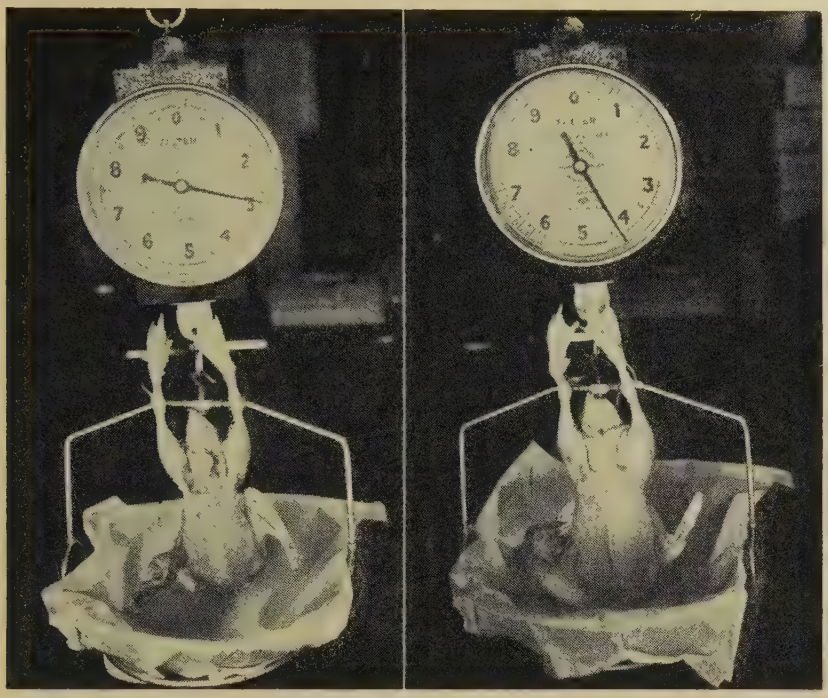


Fig. 29.

The carcase depicted on the left is an embarrassment to everyone connected with it. Too many birds of this description find their way on to the market each year and the duck itself is probably not to blame for its poor condition. Poor feeding is largely to blame for the production of inferior birds of this type. A little extra trouble will return dividends in the form of heavier carcase weghts similar to that shown by the good type export duck on the right of Fig. 29.

Dry mash will also benefit the breeding ducks as they are required to produce as many eggs as possible and access at all times to a balanced mash will assist them to do this. Also, sitting ducks are not always willing to leave the nest when the wet mash is fed. If dry mash is provided, the sitting ducks are always assured of a feed irrespective of what time of the day they leave the nest.

To encourage maximum consumption of the wet mash it should be fed in a crumbly condition similar to that recommended for hens in Departmental Leaflet No. 995. Within one half hour of feeding the wet mash it should all be eaten.

Greenfeed.

Greenfeed plays an important role in the feeding of ducks of all ages. *Coarse fibrous greenfeed should be avoided and only young succulent greens used. Should at any time the greenfeed be of poor quality of be in short supply, the farmer should immediately resort to the feeding of a Vitamin A rich feeding oil.*

By restricting the amount of greenfeed fed to the ducklings for the fortnight prior to marketing, the "bulk" in the ration is reduced. This enables the birds to eat more solid food (mash) and as a consequence maximum weights are more likely to be obtained.

TABLE 3.

RECOMMENDED RATES FOR FEEDING GREENFEED.

Age of duck.	*One wet mash fed per day, and dry mash available at all times.		Two wet mashes fed per day.
	Amount by bulk of greenfeed to be included in the wet mash when one wet mash per day is fed and dry mash is available in addition. It is assumed that the wet mash provides one half of the ducks' food intake and dry mash the other half.	Additional chaffed greenfeed to be fed to each 100 birds onee daily.	Amount by bulk of greenfeed to be included in each wet mash when two wet mashes are fed each day. No extra greenfeed to be fed apart from that in the mash.
Ducklings 1 to 3 weeks.	⅓ finely chaffed plus fish oil.	Nil.	⅓ plus fish oil.
Ducklings 3 weeks old to one fortnight before marketing.	½ (Chaffed).	¾ Kero tin (6 lb.).	½ (Chaffed).
During fortnight prior to marketing.	½ (Chaffed).	Nil.	¼ (Chaffed).
Mature ducks	½ (Chaffed).	¾ Kero tin (6 lb.).	½ (Chaffed).

* Note.—This method of feeding is considered the most satisfactory method.

Ducklings, during the first three weeks of their lives are reluctant to eat sufficient greenfeed to meet their vitamin A requirements. To prevent a vitamin A deficiency, during this period, a recognised fish oil rich in vitamin A should be fed at the strength recommended for chickens by the manufacturer. The oil should be fed in addition to the greenfeed level recommended in Table 3, and this is a most important consideration in the feeding of young ducklings.

Drinking Water.

To be successful in rearing ducklings it is essential that the ducklings have the proper watering facilities. A heavy mortality through chilling is often caused in ducklings when they are allowed to stand in water and get their down wet. This can be avoided by providing the ducklings with a font type of drinking vessel similar to that used for very young chickens as illustrated in Figure 32a. In addition to keeping the ducklings dry a font also assists in keeping the litter dry as the birds are unable to wade in the water. From the time the ducklings are three weeks of age and until they are

Fig. 30.

Ducks are most likely to be raised successfully if they are provided with ample shade. The above photograph taken in February shows a group of 14-week-old ducks and drakes under conditions conducive to the production of heavy weight ducklings during summer.

Note the dry mash feeder which provides the ducklings with food at all times of the day and night. Also the watering vessels which are placed six yards from the nearest dry mash feeder. When the watering vessels are too close to the food, the water gets very dirty.

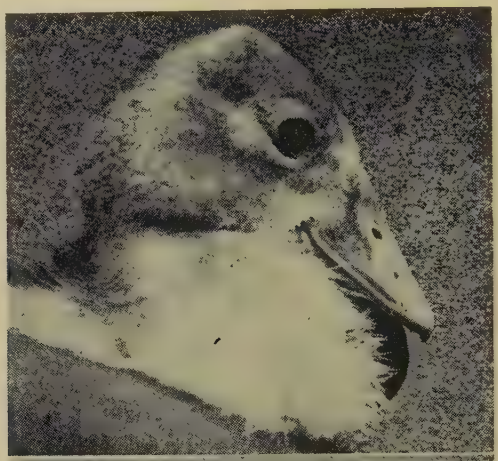
Many of the ducks in this group weighed 5 lb. at 14 weeks and some of the drakes more than 10 lb. at the same age (see Fig. 7).

It is highly important that the food and water should not be separated by a sunlit area of ground during the summer months as the birds will not travel over hot ground to get from one to the other. Ideal conditions are provided where the area of shade is large enough to easily accommodate all the ducks when they are resting during the hot period of the day in addition to one or two drinking vessels and dry mash feeders.

eight weeks old a trough type of drinking vessel—approximately 3 in. deep, 6 in. wide and 12 in. or more in length and with a grid over the top which allows the ducklings to immerse their heads but not their bodies should be used. Unless the ducklings immerse their heads, their nostrils will become blocked with food or dirt. From the time the ducklings are eight weeks old, they can be given an open topped drinking vessel similar to that described below for breeding ducks.

A circular, open topped glazed earthenware vessel 4½ in. deep, and about 14 in. in diameter is suitable as a drinking vessel for breeding ducks. A vessel of these dimensions will allow the sitting ducks all the water they require and will enable them to moisten their feathers when they leave their nest without making the surroundings unduly wet. The water should be kept in the shade at all times as tepid water is harmful and if the vessel is placed under a slowly dripping tap the birds will never be without water, neither will there be excessive water about to create filthy conditions.

(a)



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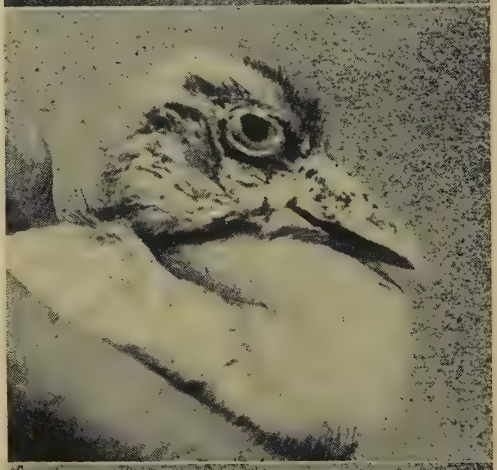

(c)

All ducklings the same age—that in (a) is a healthy duckling, while photographs (b) and (c) are of ducklings suffering with "wet eye" brought about by a deficiency of vi amin A in the diet.

Cause.—A shortage of good quality green feed and fish oil not included in the diet.

Note in (b) and (c) the discharge from the eye principally, and nostril, which has spread over a large area of down on the head. Note also the film over the inside corner of the eye. The sick ducklings are stunted as compared with the healthy duckling of the same age (a).

These photographs were taken in the field. Many dozens of ducklings were affected with this condition at the time the photographs were taken and the mortality rate was increasing daily. The whole farm was then given a proprietary fish oil at the strength recommended by the manufacturer and within two weeks the condition had entirely disappeared.

Now that this farmer realises the value of a vitamin A rich supplement to his duck rations he will probably never again experience this disease in his ducks.

Fig. 31.

(a)

(b)

Fig. 32.

(a) Shows two drinking fonts of the type recommended for ducklings three weeks of age and younger. It is highly important that young ducklings should keep their bodies dry as on wetting they quickly become chilled, and this can lead to heavy mortality. At the same time it is essential that the ducklings should be able to fully immerse their heads and flush out their nostrils which are apt to become blocked with food and dirt. Fonts which have the same dimensions as those shown in (a) enable the ducklings to do this. The fonts are each 1½in. deep and there is 1½in. between the side of the bowl and the side of the pan. The glazed porcelain pan has an internal diameter of 6¼in. and the metal tray 8in.

Glazed porcelain drinking vessels are preferred because they are easily kept clean and do not rust. The drinking vessels should be cleaned out and refilled at least once every day.

From the time the ducklings are three weeks of age and until they reach eight weeks of age a shallow drinking trough 3in. deep and about 6in. wide, with a grid over the top which allows the ducklings to immerse their head without actually getting their bodies into the water will be found satisfactory.

When ducklings reach the age of eight weeks they can be given a drinking and bathing vessel similar to the glazed porcelain vessel shown in figure 32 (b) and which has the following dimensions:—Depth, 4½in.; diameter at base, 12in.; diameter at top, 14in.; rim, 1¼in. wide. A vessel of this size when placed in the shade under a slowly dripping tap, will be sufficient for as many as 60 growing ducks or 40 breeding ducks. Many people think that domestic ducks require large volumes of water and accordingly provide them with swimming pools. This is not correct, however, and the ideal is to have a relatively small supply of water available to the birds at all times. A lot of water will do more harm than good.

Ducks, particularly growing ducklings must have a continuous supply of clean cool water before them at all times as an irregular supply, apart from retarding the ducks' development may be the cause of "staggers" and of a heavy mortality.

The water must be kept clean, and should be changed once a day. The slime should be removed from the sides and bottom of the vessel at least once every week. Large volumes of water as are provided with large duck ponds of swamps are not necessary and only create unhygienic conditions.

Grit.

Ducks fed diets that are balanced from a mineral aspect do not require shell grit. They do however, require insoluble grit to assist the gizzard to macerate the food.

Angular shaped quartz or granite gravel is suitable and metropolitan farmers will find blue metal dust obtainable from local quarries very suitable. Young ducks can be given "⅛ all in" and older birds "¼ all in." (Trade names.)

A barrow load of metal dust deposited in a convenient clean spot in the run will meet the flock requirements for many months.

Points on Marketing.

Having produced prime market birds care should be taken to see that their value does not depreciate before they reach market. Ducks are more attractive if marketed in a clean condition and even during winter it is possible to market birds with snow white plumage if they are placed in a pen which has a clean well drained run, and clean dry shelter for a week prior to their despatch.

A catching enclosure, erected as described on Page 237 will be found helpful in catching the ducks, and when caught the birds are best held by the wings until placed in the market crate.

The standard poultry crate which is supplied by most firms dealing in table poultry measures 48 in. x 21 in. x 15 in. and will hold 8-10 drakes, or 12-14 ducks. Overcrowding, apart from being cruel, results in bedraggled appearance and does not pay.

Birds that travel a long distance to market should be provided with food and water and a convenient way of doing this is to three-quarter fill the drinking vessel (usually a large jam tin which is wired to the side of the crate) with soaked wheat, and then just cover the wheat with water. The wheat discourages the water from splashing over the sides of the vessel, and if the wheat is well soaked before it is placed in the drinking vessel, the water in the wheat itself will be very satisfying to the birds.

DISEASES.

Compared with the domestic fowl, ducks suffer from relatively few diseases. Provided they are fed a balanced diet, given clean, dry, well ventilated, non-draughty sleeping quarters, prevented from overcrowding, and kept free from vermin, the incidence of disease should be very small indeed.

The following diseases in order of importance are those most likely to affect ducks in Western Australia.

1. Wet eye or Avitaminosis A (Vitamin A defficiency).
2. Spirochaetosis (tick fever).
3. Rickets.
4. Salmonellosis.
5. Pneumonia.
6. Staggers.
7. Enteritis (inflamation of the intestines).
8. Botulism (limber neck).

1. Wet Eye or Avitaminosis A (Vitamin A Deficiency).

"Wet eye" is the most common disease affecting ducks in this State and, as the name suggests, the most obvious sympton shown by ducks with this disease is an eye discharge. Practically every outbreak of "wet eye" in Western Australia can be traced back to a deficiency of vitamin A in the diet. When ducklings that have discharging eyes are given a vitamin A rich supplement they invariably make a rapid recovery. The disease is sometimes referred to as "white eye."

Symptoms of Wet Eye.—Young ducks prior to fledging and up to six weeks of age are most usually affected and outbreaks seldom occur after the eighth week. In the early stages of the disease a few ducklings may appear listless and show leg weakness. There is usually a colourless discharge from the eyes and nostrils. At this stage the ducklings may stagger and a few deaths may occur. If the the disease is allowed to progress the discharge from the eyes may become more solid and a ring of discharge will form on the down around the eye. The eyelids may stick together, rendering the duckling completely blind. Sometimes a white film develops over the eye and the cornea of the eye becomes opaque (hence the name "white eye") causing a partial blindness. At this stage a heavy mortality can be expected. The ducklings lose the use of their legs, roll on their backs and struggle until they die. Diarrhoea is often present.

Importance of Vitamin A.—Vitamin A is essential in the diet to maintain a normal healthy condition of the body. The conjunctiva of the eyes and the mucous membranes lining the mouth, throat and nostrils are particularly dependent on vitamin A to prevent degeneration of these tissues and to maintain their resistance to disease organisms.

The principal natural source of vitamin A is from green feed. By green feed is meant young succulent greens and not old, coarse fibrous material which should never, under any circumstances be fed to poultry.

Ducklings during the first four weeks of their life grow very quickly and maximum growth rates must be maintained if the ducks are to be raised economically. In addition to preventing "wet eye," Vitamin A is required for maximum growth. Unlike chickens, young ducklings up to three weeks of age are not very fond of green feed, even if it is young and succulent and of good quality. It is probable,

therefore that in some instances ducklings when given ample green feed, derive from it enough vitamin A to prevent "wet eye", but not sufficient to maintain maximum growth rates. In many other instances insufficient vitamin A is obtained from greenfeed to prevent "wet eye" and to be on the safe side, young ducklings 1-3 weeks of age in addition to receiving as much greenfeed as they can eat, should receive, in their diet, a fish-oil rich in vitamin A at the level recommended for chickens by the manufacturer. In the absence of good quality green feed, or when the parent ducks have been fed a ration low in vitamin A, the ducklings should most certainly be given an oil rich in vitamin A, at the level just mentioned. "Wet eye" is particularly prevalent in ducklings reared by "back-yarders" during the summer months and in most cases can be prevented simply by thoroughly mixing a reliable fish oil with the mash.

The severity of a vitamin A deficiency in young ducklings will depend to a large extent on the level of vitamin A fed to the female parent from which the ducklings are bred. A low vitamin A intake by the breeders will result in low egg production and poor hatchability in the eggs which they do lay. The ducklings which hatch from the eggs will also probably show signs of a vitamin A deficiency during the first two weeks of life. The importance of providing adequate vitamin A to the breeders as well as to the ducklings to guard against poor rearability in the ducklings should, therefore, be appreciated. All classes of poultry require adequate levels of vitamin A in their diet for optimum results. Should good quality greenfeed ever become scarce the farmer should not hesitate to feed a proprietary fish oil.

Importance of Adequate Protein and Mineral Intake.—Apart from a lack of vitamin A in the diet, other dietary deficiencies which lower the resistance of the ducklings to disease, and which result in sub-optimum growth rates will contribute towards an outbreak of "wet eye". In particular, a protein or mineral deficiency in the diet will pre-dispose the birds to this disease.

Other Predisposing Causes.—Apart from faulty nutrition any factors of management such as wet, cold, dirty conditions, which serve to lower the duckling's resistance to disease should of course be avoided.

Water troughs which contain clean water deep enough to allow the ducklings to immerse their heads but which prevent them from getting their bodies wet, will assist in controlling "wet eye."

Ducklings should not be allowed to become wet until they are fully fledged, as they chill very readily. When it rains they must be able to shelter in dry quarters. Their quarters should be kept clean, dry and well ventilated without being draughty. The shed should be built with its back to the prevailing winds.

Skim-milk is an excellent foodstuff for ducklings and, if available, should be used to moisten the wet mash. It should not, however, be given to the ducklings to drink.

If the fundamental cause of "wet eye' which is so prevalent in this State at the present time was eliminated by giving the ducklings their full requirements of vitamin A right from day old, it is very likely that cases of this disease would be rare. It should be a very comforting thought to duck-keepers in this State to know that the

disease can be so easily avoided and it is hoped that this section of the poultry industry will, in the future, make greater use of fish oils rich in vitamin A than they have in the past.

Some feeding supplements rich in vitamin A and obtainable in Western Australia are "Vita-Oil A", "Vetemul" (blue label) and "Ovadol."

These feeding supplements have materially assisted the production of hen eggs in this State over the past few years and they can be equally valuable to the duck farmer. Recommendations as to their use are given on the container. No benefit will be derived by feeding them at a higher level than that recommended by the manufacturer.

What Role do Organisms Play.—It has been suggested in other countries that actual disease organisms may in some instances be responsible for symptoms which we normally associate with a vitamin A deficiency. The organism or organisms that may in some instances be responsible have not been identified, but from the rapidity with which the disease sometimes spreads from one duckling to another in the same clutch and from clutch to clutch, it is thought that a highly infectious micro-organism—perhaps a virus, might in these cases be responsible.

Practically every reported outbreak of "wet eye" in this State of recent years has, however, been traced back to a vitamin A deficiency in the diet, and sick ducklings, provided the disease is not too far advanced, will invariably recover when a fish oil rich in vitamin A is fed. At the same time a drop of 10% solution of argyrol should be placed in each eye daily until the eyes regain their healthy condition. The argyrol will assist in destroying any organism that may be present in the eye and will give instant relief to the eye through helping to overcome irritation caused by degeneration of the eye tissues.

Ducklings affected with "wet eye" should be isolated from the rest of the flock.

2. Spirochaetosis (Tick Fever).

Spirochaetosis or *tick fever* is a very common disease in fowls in Western Australia particularly in the metropolitan and wheat belt areas. The disease is caused by the micro-organism *Treponema anserinum*, a spirochaete which is found in the blood of both diseased fowls and ducks. An intermediate host is required to transmit the disease organism from one bird to another and either fowl tick or poultry red mite can do this, the most common carrier being fowl tick. The tick live in cracks and crevices in the house during the day time and at night leave their hiding places and suck the duck's blood at the same time injecting the spirochaete into the duck's blood stream. This results in symptoms typical of tick fever, namely feverishness, listlessness, paralysis and bright green or whitish diarrhoea. The duck may recover but usually death occurs a few days after infection.

The control of the disease is by means of eradication of the intermediate host, in this case fowl tick or red mite. This entails a thorough spraying of the crevices of the house with a spray which contains creosote. Details of suitable sprays for combating tick are given in a leaflet on controlling tick which may be obtained on application to this department.

Fig. 33.

Fig. 33 shows a mechanical plucker being used to defeather a duck at a local slaughtering establishment. The plucker comprises a fast revolving drum with rubber fingers attached. The feathers are removed and fall into a bin as the fingers brush over the bird's body.

Fig. 34.

Fig. 35.

Where hand plucking is practised the birds are immersed in a scalding tank for one minute. They are then placed immediately into a tub of cold water and the feathers are removed while the birds are in the cold water. Studying figure 34 from right to left we see ducks being slaughtered (the throat is cut while the bird is held in the funnel shaped holder)—the scalding tank—and hand plucking being done while the birds are in cold water.

As soon as all the feathers are removed the carcases are placed in another container of cold water and left there for some time. (See figure 35.) They are then dried and pre-chilled in preparation for packing. The cold water improves the appearance of the birds' skin which loses its yellow colour and takes on an attractive white appearance.

Fig. 36.

Hand finishing after the majority of the feathers have been removed by a mechanical plucker

Fig. 37.

Following plucking, the carcases are lightly singed before being placed in tanks of cold water where they are held for some time to improve their colour.

Fig. 38.
Drakes graded for size to form a uniform pack.

Fig. 39.
An attractive export pack.

Fig. 40.
Check weighing prior to shipment.

3. *Rickets.*

Cases of well-grown, otherwise healthy ducklings that have lost the use of their legs and sit on their haunches are, at times, brought to the notice of this Department. When these cases are investigated it is frequently found that the ducklings are not receiving sterilised bonemeal in the mash or have been deprived of the direct rays of sunlight. In other words, the ducklings are not suffering from rickets or a soft bone condition due to a lack of calcium phosphate in their bones. When the deficiency in the diet is corrected or sunlight is provided, the ducklings quickly regain the use of their legs. The rations given in Table 2 contain approximately 3 per cent. of sterilised bonemeal and this level provides ducklings with adequate calcium and phosphorus for bone development, but unless the ducklings are exposed to sunlight which provides vitamin D they cannot utilise these minerals. Ducklings should be allowed the direct rays of sunlight before they are a fortnight old. A few hours sunlight per day is sufficient. Rickets is most common in quickly growing ducklings between the ages of 4 and 10 weeks. For further details on rickets see pages 26-30 inclusive, of Departmental Leaflet No. 995.

4. *Salmonellosis.*

The cause of this disease is closely related to pullorum disease in chickens. It is more commonly seen in young birds than in older birds. The main symptoms are fever, diarrhoea and prostration with a high mortality. Birds which recover are likely to remain as "carriers" which are capable of causing further outbreaks. Affected clutches should be isolated and if the mortality rate is high it would be advisable to destroy the whole clutch including the mother. Sulphamezathine treatment will greatly reduce losses in most cases, but a large proportion of recovered birds will remain as "carriers." Consequently treated birds should be slaughtered when they reach maturity.

5. *Pneumonia.*

Conditions similar to those which cause chills in ducklings will also predispose ducklings to pneumonia caused by bacterial or fungal infection of the lungs. There is no cure for this condition.

6. *Staggers.*

As the name implies this condition is indicated by a staggering gait. Ducklings affected with staggers very often lie on the flat of their backs and die in a short time. A number of factors can cause this condition. These include vitamin A deficiency, tick fever, sunstroke and allowing ducklings that have been without water for some time to drink large quantities of cold water, so causing intestinal cramp and leg weakness.

Ducklings should never be without plenty of fresh, clean, cool water. Should the ducklings' supply of water run out, warm milk should be the first drink given, followed by small amounts of cool water.

7. *Enteritis.*

Enteritis may be brought about by feeding too much bread, excessive salt, de-composed foodstuffs, or by specific bacterial infections of the type related to those which commonly cause a similar condition in humans.

8. *Botulism.*

(See also Departmental Leaflet No. 1010, page 13.)

Botulism or Limber Neck is brought about by the ducks eating de-composed vegetable or animal material which contains the potent foodpoisoning organism *Clostridium botulinum.*

Birds affected with Botulism lie with their necks outstretched on the ground and appear to be in a coma. The legs and wings may be paralysed and the feathers usually come away easily when pulled from sick birds. The mortality rate through this cause can be high, and when the symptoms are first noticed a search should be made for decaying animal matter such as rabbit carcases or old bones, and decaying vegetable material which might for instance be found in a stagnant water hole.

ACKNOWLEDGMENTS.

The value of this article is greatly enhanced by the inclusion of the many photographs which with the exception of one were all taken in Western Australia by the Government Photographer, Mr. C. Balmer, and the writers are most grateful to Mr. Balmer for his untiring efforts in obtaining these photographs.

Many of the photographs were taken on private farms and on the premises of two local poultry dressing establishments. Grateful acknowledgment is made to the following for their ready co-operation which assisted the writers to compile a photographic record of the raising and marketing of ducks in this State:—

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Mr. L. Woodard, Belgravia Street, Belmont.

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The Poultry Growers of Western Australia, Co-operative Society Ltd., Welshpool.

REVIEW

DAIRYFARMING ANNUAL, 1950, published by Massey Agricultural College, Palmerston North, New Zealand, 200 pages, price 10s. (N.Z.).

A wide field of good farming practice based on the results of research and the experiences of progressive dairyfarmers, is covered in Dairyfarming Annual, 1950, a 200-page book just published by

Massey Agricultural College, Palmerston North, New Zealand. This attractively printed journal has been compiled with a view to ease of reading and ready reference. It includes several outstanding contributions, among which is an outline of what might be done to improve conditions and production on an average dairy farm, by Dr. C. P. McMeekan, Superintendent of Ruakura Animal Research Station. Farmers' production problems are dealt with also by E. P. Nielsen, Consulting Officer, Herd Recording Department of the New Zealand Dairy Board, and Dr. W. M. Hamilton, Department of Scientific and Industrial Research. A comparison of farming conditions in New Zealand and Great Britain is drawn by E. Bruce Levy, Director of the Grasslands Division, Department of Scientific and Industrial Research, who gives some useful advice as a result of his recent visit overseas. The more human side of life on the farm has been given some prominence in two articles: "Making Country Life More Attractive" (by L. J. Wild, former Principal of Fielding Agricultural High School) and "Saving Time and Labour on Dairy Farms" (by W. E. Scott, Kapuni, and A. H. Ward, Director of Herd Improvement, New Zealand Dairy Board). Other aspects of farming to which this Annual should provide a handy reference are diseases in the dairy herd, the future of artificial insemination, farm trees in relation to weeds, porker-pig production, and farm accounts. The basis of the book (price 10s. N.Z.) consists of the addresses and discussions at the 1950 meeting of dairy-farmers at Massey College, and in addition there are authoritative articles on other farming subjects.

Dairy Herd Improvement Scheme 1950-1951

R. A. BETTENAY, Agricultural Adviser

At the conclusion of the 1949-1950 Grade Herd Recording year, the commencement of the season was brought forward two months so as to agree more closely with the time when cows commence to calve in the dairying areas. The Grade Herd Recording year now commences at 1st March and finishes at 28th February.

In this, the first year with the new opening date, it was necessary to include March and April productions for the previous year in the total for the new season, even though production in these two months had already been included in an annual report. By this means the season was lengthened to 12 months and so is comparable to all other seasons.

As in the previous year, the Department has insisted that all cows in a herd under test be tested, and a class is provided for cows which for some reason or other are incapacitated and so incapable of high production. Cows in this category, known as "B" class cows are tested free of charge and are not included in the averages for the herd nor for the scheme as a whole.

It is pleasing to be able to record that once again the number of cows under test has shown a substantial increase, rising from a record number of 15,309 in the previous year to a new high of 17,391 in the year under review. It is however, disappointing that the increase in the number of cows under test has been accompanied by a decline in the average production per cow. A contributing cause of the lower average production would appear to be the widespread habit of dairy farmers drying off the whole herd in December or January even though some of the cows have been milking for only three to four months.

It has been frequently stressed by this Department that the most rapid means to increase the average production of cows in this State would be to keep all cows milking for a full 9-10 months lactation period. A two months rest period before the commencement of the next lactation is considered sufficient for the cow to be able to calve in good condition. It is believed that the objective of a 10 months lactation followed by a two months dry spell is within the capacity of the average cow in this State and it falls upon the dairy farmer to see that his cows get the opportunity to produce for this length of time if they are capable of doing so. Combined with the Departmental recommendation to calve all cows in April and May, in other than the whole milk zone, this practice would still give the farmer a rest period in February and March when few cows were milking.

Extent of Testing.

In Table 1 is given the number of cows under test in each year since the commencement of the scheme in 1933. It will be seen that the number of cows tested is a record as is also the percentage of the cows in the dairying areas under test. Two additional units were formed during the season and 29 units were in operation this year containing a total of 626 herds.

Table 1.

Year.	Cows in Dairying Areas.	Cows Under Test.		No. of Herds Tested.	No. of Units.	Average No. of Herds per Unit.	Number of Cows per Unit.	Average No. of Cows per Herd.
		Number.	Per cent.					
1933–34	74,900	4,308	5·8	159	8	20	538	26
1934–35	77,328	4,088	5·3	142	8	18	501	29
1935–36	76,745	4,590	6·0	178	9	20	510	26
1936–37	78,547	9,115	11·6	356	18	20	506	26
1937–38	82,893	10,033	12·1	393	19	21	528	26
1938–39	85,300	12,368	14·5	485	23	21	538	26
1939–40	90,169	11,479	12·7	465	23	20	499	26
1940–41	94,891	9,609	10·1	409	20	20	480	23
1941–42	98,850	7,081	7·2	301	16	19	443	24
1946–47	102,256	11,944	11·7	432	21	21	569	28
1947–48	104,193	12,395	11·9	460	24	19	516	27
1948–49	107,223	12,692	11·8	477	25	19	508	27
1949–50	106,617	15,309	14·4	557	27	21	567	27
1950–51	*	17,391	....	626	29	22	600	28

* Not yet available.

It is very pleasing to note that the number of cows per unit has reached the record number of 600, being an increase of 33 over the previous year. It is only by increasing the number of cows per unit that the cost per cow can be kept at a minimum.

The general picture provided by the foregoing figures is a pleasing one as it indicates that farmers generally are keen to have their cows tested and that they are appreciative of the benefits to be gained from a knowledge of the individual productions of cows in their herd. Production figures must form the basis of the herd culling programme if herd improvement is to be made.

Average Yields.

In Table 2 is presented the average yields of all cows under test in each year since the commencement of testing. Average production of butterfat in the present year is disappointingly low, being 191.08 lb. The decline on the previous years records was almost entirely in the butterfat percentage which declined from 4.35 to 4.28, milk production in the same period dropped only to the extent of six gallons per cow down to the figure of 447 gallons. The reason for the decline in fat percentage which has taken place over the last two years is rather obscure.

TABLE 2.

AVERAGE PRODUCTION PER COW, 1933–1950.

Year.	Number of Cows.	Milk.	Test.	Butterfat.
		gals.	%	lb.
1933–34	4,308	415	4·35	180·60
1937–38	10,033	486	4·59	223·10
1938–39	12,368	487	4·48	218·70
1939–40	11,479	462	4·51	208·30
1940–41	9,609	447	4·45	199·00
1941–42	7,081	496	4·52	224·02
1946–47	11,944	420	4·36	181·00
1947–48	12,395	478	4·46	213·30
1948–49	12,692	481	4·47	214·71
1949–50	15,309	453	4·35	196·90
1950–51	17,391	447	4·28	191·08

TABLE 3.

PRODUCTION OF HERDS ACCORDING TO THE NUMBER OF YEARS OF CONTINUOUS TESTING.

Year.	First Time.			Second Time.			Third Time.			Fourth Time.			Total.		
	No. of Herds.	No. of Cows.	Av. Prod.	No. of Herds.	No. of Cows.	Av. Prod.	No. of Herds.	No. of Cows.	Av. Prod.	No. of Herds.	No. of Cows.	Av. Prod.	No. of Herds.	No. of Cows.	Av. Prod.
1946–47	432	11,944	181·0	....	....	....	....	....	....	....	....	....	432	11,944	181·00
1947–48	210	5,411	199·2	254	6,923	223·8	....	....	....	....	....	....	464	12,234	213·30
1948–49	162	4,078	197·6	131	3,516	216·4	175	4,857	224·0	....	....	....	468	12,451	214·71
1949–50	255	6,720	183·6	98	2,645	199·5	92	2,577	203·3	112	3,367	216·4	557	15,309	196·90
1950–51	259	6,542	177·2	147	4,194	194·6	72	2,048	197·9	148	4,607	204·6	626	17,391	191·08

Value of Testing Continuously.

It is unfortunate that many dairy farmers apparently have the mistaken idea that it is sufficient to have their herd tested for one year, thereby permitting the culling of the lowest producers and they discontinue testing after one or two years. That testing continuously over a number of years does prove beneficial and economical may be demonstrated as in Table 3 in which it is shown that in any one year herds being tested for the second time give higher average production than cows being tested for the first time; herds being tested for the third time show a further increase in yield and herds being tested for the fourth time show even higher average yields.

It would appear from the table, showing figures for the last five years, that herds tested for the second year average approximately 15-20 lb. higher than herds being tested for the first time; herds tested for the third time show a further 5 lb. increase in average production and there is still an additional increase with further years of continuous testing. Whilst it must be admitted that portion of the increase in the second year as compared with the first is brought about by the method of calculating average production, nevertheless the increase in the third and fourth year at least would appear to be brought about almost entirely as a result of testing and the consequent culling made possible. Considering that the cost to the farmer is only 3s. 6d. per cow it is obvious that the service is well worthwhile.

A further reason why continuous testing is desirable is since only the very low producers should be culled as a result of one poor lactation. Many mediocre producers deserve a second chance and only if they fail again in the second lactation should be culled from the milking herd. By means of continuous testing combined with a sound system of record keeping improvement is possible providing some unforseen circumstance, such as the necessity for heavy culling for disease, sterility, etc., does not eventuate.

Results of the Units.

The performances of the various units are shown in Table 4 in order of merit. Cowaramup was the leading herd with 222.9 lb. of butterfat per cow. Although this was a decrease of approximately 22 lb. over production of the previous year, it is nevertheless a very creditable performance. Cowaramup has now been the leading unit for three consecutive years and is to be congratulated on an excellent performance.

Capel, with over 1,000 cows in the unit, also performed very well to rise to second place in the second year in which the unit has been testing.

Of the units which produced poorly, Collie was a new unit and not tested for a complete year, and Manjimup was tested for the first time after a break of one year. Pemberton and Karridale however, are disappointingly low, especially Pemberton, which has been consistently low for a number of years.

The percentage of heifers in the various units varied from as low as 23.5% in Capel to the high figure of 61.9% in Mount Barker and averaged 37% over all units.

TABLE 4.

PRODUCTION PER COW IN EACH UNIT.

(Including all cows producing for 90 days or more in the 12 months).

Unit.	No. of Herds.	No. of Cows.	* Per cent. of Heifers.	Average Milk lb.	Test.	Average Butter-fat lb.	Average Butter-fat 1949–50.	Average Butter-fat 1948–49.
Cowaramup	20	570	36·5	5,119	4·36	222·9	243·2	257·8
Capel	21	1,050	23·5	5,541	4·01	218·3	205·2	....
Northcliffe	23	568	39·6	4,578	4·60	210·6	207·3	219·6
Pinjarra	22	728	44·0	4,960	4·15	206·0	206·6	212·1
Brunswick	22	722	34·6	4,494	4·57	205·3	215·2	225·2
Walpole	21	427	31·9	4,417	4·62	204·1	189·1	....
Donnybrook	24	555	43·9	4,309	4·68	201·8	212·6	225·2
Vasse	21	662	39·9	4,624	4·35	201·3	183·1	189·9
Forest Grove	23	583	34·3	4,542	4·41	200·5	205·8	224·8
Albany West	21	443	44·0	4,609	4·33	199·9	221·6	....
Armadale	23	735	32·8	4,992	3·98	198·9	186·1	206·2
Balingup	21	619	36·3	4,538	4·37	198·1	211·4	216·5
Mt. Barker	23	686	61·9	4,571	4·33	197·7	188·0	197·6
Harvey	24	1,000	36·4	4,856	4·05	196·5	210·9	222·9
Bridgetown	23	625	24·5	4,139	4·54	187·9	180·8	182·8
Margaret River	19	451	36·1	4,411	4·25	187·8	197·9	228·7
Metricup	17	605	30·9	4,545	4·07	184·9	165·3	186·8
Albany	18	373	38·1	3,912	4·66	182·4	178·4	215·2
Wilga	23	505	36·8	4,269	4·27	182·1	193·9	172·8
Ruabon	20	705	43·3	4,625	3·94	182·0	213·9	208·9
Scotsdale	22	453	57·6	3,997	4·50	180·0	171·5	210·8
Waroona	14	584	32·0	4,211	4·26	179·5	191·7	230·7
Denmark	21	439	35·8	3,936	4·48	176·2	169·6	251·6
Rosa Brook	19	493	32·0	3,980	4·36	173·6	190·6	255·7
Nannup....	20	512	39·1	4,283	4·04	173·1	216·0	218·3
Manjimup	25	654	26·3	3,959	4·15	164·1	....	184·0
Karridale	26	662	52·4	3,750	4·32	162·2	145·3	....
Pemberton	26	542	27·1	3,853	4·19	161·3	171·0	207·4
Collie	24	440	34·1	3,708	4·14	153·8	....	....
Total	626	17,391	37·0	4,470	4·28	191·08	....	....

* Heifers include all cows 3 years old or less.

Herds Grouped according to Production.

Table 5 shows a grouping of herds according to production. It will be noticed that in the present year no herd averaged over 350 lb. of butterfat per cow and only 1% averaged over 300 lb. 62.6% of the herds averaged less than 200 lb. of butterfat per head.

TABLE 5.

HERDS GROUPED ACCORDING TO PRODUCTION.

Butterfat per head (lb.).

Year.	Over 400.	350–400.	300–350.	250–300.	200–250.	150–200.	100–150.	Under 100.
	%	%	%	%	%	%	%	%
1933–34	....	....	1·3	3·9	20·3	53·6	18·3	2·6
1939–40	....	....	3·2	18·5	34·6	32·9	9·7	1·1
1940–41	....	....	1·5	13·9	31·8	39·4	12·7	0·8
1941–42	....	1·6	8·2	21·9	42·1	21·5	4·7	....
1946–47	....	....	1·2	7·9	25·2	39·9	22·4	3·4
1947–48	....	0·6	3·9	18·1	38·8	27·6	10·2	0·8
1948–49	0·6	0·8	5·2	17·6	38·7	28·7	7·3	0·8
1949–50	....	....	1·8	10·2	29·1	38·6	17·1	3·2
1950–51	....	....	0·9	8·2	28·3	42·3	16·1	4·2

Cows Grouped according to Production.

When we consider the individual cows and their grouping according to production, the result is a little more heartening and there are a few individuals which averaged over 500 lb. of butterfat.

TABLE 6.

COWS GROUPED ACCORDING TO AGE AND PRODUCTION.

(All Cows tested 90 days or more).

Year.	Age.	Over 600.	500–600.	400–500.	300–400.	200–300.	150–200.	100–150.	Under 100.	Total Cows.
		%	%	%	%	%	%	%	%	
1942	Mature	0·02	0·30	2·40	21·80	46·40	17·40	8·70	3·00	4,287
1947	Mature	....	0·07	0·68	7·97	35·16	26·37	20·13	9·62	8,711
1948	Mature	0·01	0·10	1·85	14·84	42·11	21·21	13·67	6·21	8,999
1949	Mature	0·03	0·19	2·32	15·42	40·64	21·89	13·14	6·34	8,713
1950	Mature	....	0·05	1·25	12·14	40·66	22·46	15·56	7·88	9,323
1951	Mature	....	0·03	1·05	11·89	40·40	23·28	16·84	6·31	10,965
1942	Heifers	....	0·05	0·20	5·80	36·80	27·50	20·20	9·40	1,978
1947	Heifers	....	....	0·10	3·20	25·50	29·40	25·80	16·00	3,232
1948	Heifers	....	0·05	0·21	7·14	36·42	26·58	19·16	10·44	3,396
1949	Heifers	....	0·02	0·43	6·98	38·80	26·26	18·58	8·99	3,979
1950	Heifers	....	....	0·15	4·61	29·65	28·32	23·91	13·36	5,773
1951	Heifers	....	....	0·10	4·00	27·62	30·19	24·60	13·49	6,42

This is shown in Table 6 where the very great variation in production of individual cows is apparent. In considering the very great number of cows with low productions of 150 lb. or less it must be realised that this table, as Table 5 above, includes all cows tested for 90 days and over in the 12-monthly period from 1st March to 28th February. Many incomplete lactations are included and others where the herd was dried off when some cows had been milking for only 90 days. Thus the low figures should not be taken to indicate that the potential producing ability of the cows is at this low level.

It will be noticed from Table 6 that more of the mature cows fall into higher range groups than of the heifers. This is to be expected as it is well known that production in general increases with age up to maturity at 5-6 years of age.

Performance of Units—Complete Lactations.

In Table 7 is set out the average production in the various units when lactations known to be incomplete are excluded. It will be noticed that only 11,848 cows milked for a complete lactation in the 12 months and this constitutes only 68% of the total cows under test. Production when lactations known to be incomplete are excluded, amounted to 198.8 lb. per cow, an increase of nearly 8 lb. over the average for the scheme as a whole.

Variation from the table of 90-day and over lactations (Table 4) is much greater in some units than in others since the proportion of cows failing to complete test within the 12 months was very variable between units.

TABLE 7.

PRODUCTION PER COW IN EACH UNIT.

(Complete Lactations in 12 months.)

Unit.	No. of Cows.	Average Milk.	Test.	Average Butterfat.
		lb.	%	lb.
Mt. Barker	207	5,584	4·44	247·7
Cowaramup	382	5,385	4·28	230·8
Walpole	194	5,158	4·31	222·2
Armadale	311	5,354	4·08	218·3
Capel	1,021	5,437	4·02	218·3
Pinjarra	594	5,234	4·15	217·5
Northcliffe	433	4,647	4·59	213·1
Forest Grove	399	4,641	4·58	212·7
Brunswick	469	4,688	4·52	211·7
Albany, West	257	4,744	4·41	209·5
Donnybrook	445	4,383	4·63	203·1
Harvey	525	5,011	4·05	202·8
Balingup	547	4,662	4·34	202·4
Vasse	550	4,643	4·33	201·1
Margaret River	342	4,631	4·27	197·8
Nannup	318	4,962	3·99	197·5
Bridgetown	491	4,197	4·60	193·0
Albany	262	4,087	4·65	190·0
Waroona	367	4,453	4·24	188·9
Metricup	443	4,520	4·11	185·8
Collie	172	4,432	4·16	184·4
Rosa Brook	363	4,205	4·37	183·7
Ruabon	560	4,627	3·96	183·3
Wilga	417	4,255	4·26	181·1
Scotsdale	332	3,965	4·50	178·3
Denmark	50	3,684	4·81	177·2
Karridale	534	3,847	4·34	170·2
Pemberton	355	3,961	4·21	166·9
Manjimup	508	3,990	4·16	165·9
Total	11,848	4,649	4·28	198·8

Performance of Units—273-day Productions.

In Table 8 are shown the average productions in each unit for cows which milked for 273 days in the 12-monthly period 1st March—28th February. This includes some cows which milked for part of the year in one lactation and part of the year in a following lactation.

It will be noticed that average production over all units producing for 273 days was 255.4 lb., an increase of 64.3 lb. over the average for all cows. Brunswick was the highest producing unit with an average of 296.3 lb., and Manjimup had the lowest average for 273 days productions with 205.3 lb. Only 18.2% of all cows produced for 273 days in the 12 months.

This table is a good one to illustrate the increased production that can be obtained by keeping cows in milk for a full lactation period. It shows that cows in milk for nine months produced 255.4 lb., which is a much greater amount that the State average.

As a contrast, cows completing lactation but milking for less than 273 days averaged only 178.2 lb. of butterfat. Hence the importance of keeping cows in production for as long a period as possible up to 9-10 months is obvious.

TABLE 8.

PRODUCTION PER COW IN EACH UNIT.

(273-day Production.)

Unit.	No. of Cows.	Average Milk.	Test.	Average Butterfat.
		lb.	%	lb.
Brunswick	114	6,046	4·90	296·3
Donnybrook	101	5,759	5·09	292·9
Capel	67	7,088	4·03	285·8
Cowaramup	172	6,256	4·40	275·4
Northcliffe	180	5,578	4·62	275·6
Mt. Barker	98	6,203	4·42	274·3
Walpole	138	5,823	4·68	272·6
Armadale	167	6,746	4·00	270·6
Pinjarra	115	6,412	4·22	270·4
Collie	9	6,474	4·18	270·3
Harvey	176	6,382	4·19	267·3
Vasse	88	6,069	4·39	266·6
Albany, West	61	5,878	4·49	264·1
Albany	73	5,352	4·91	262·5
Nannup	80	6,597	3·98	262·3
Metricup	98	6,411	4·02	257·8
Margaret River	94	5,886	4·36	256·8
Wilga	71	5,446	4·59	249·9
Forest Grove	171	5,441	4·56	247·9
Waroona	116	5,655	4·37	246·9
Ruabon	105	6,104	4·03	246·3
Bridgetown	74	5,329	4·57	243·8
Balingup	191	5,455	4·43	241·9
Karridale	87	5,304	4·40	233·3
Rosa Brook	119	5,495	4·19	230·3
Scotsdale	160	4,816	4·55	219·2
Pemberton	110	5,161	4·19	216·6
Denmark	46	5,227	4·00	209·1
Manjimup	76	4,937	4·16	205·3
Total	3,157	5,826	4·38	255·4

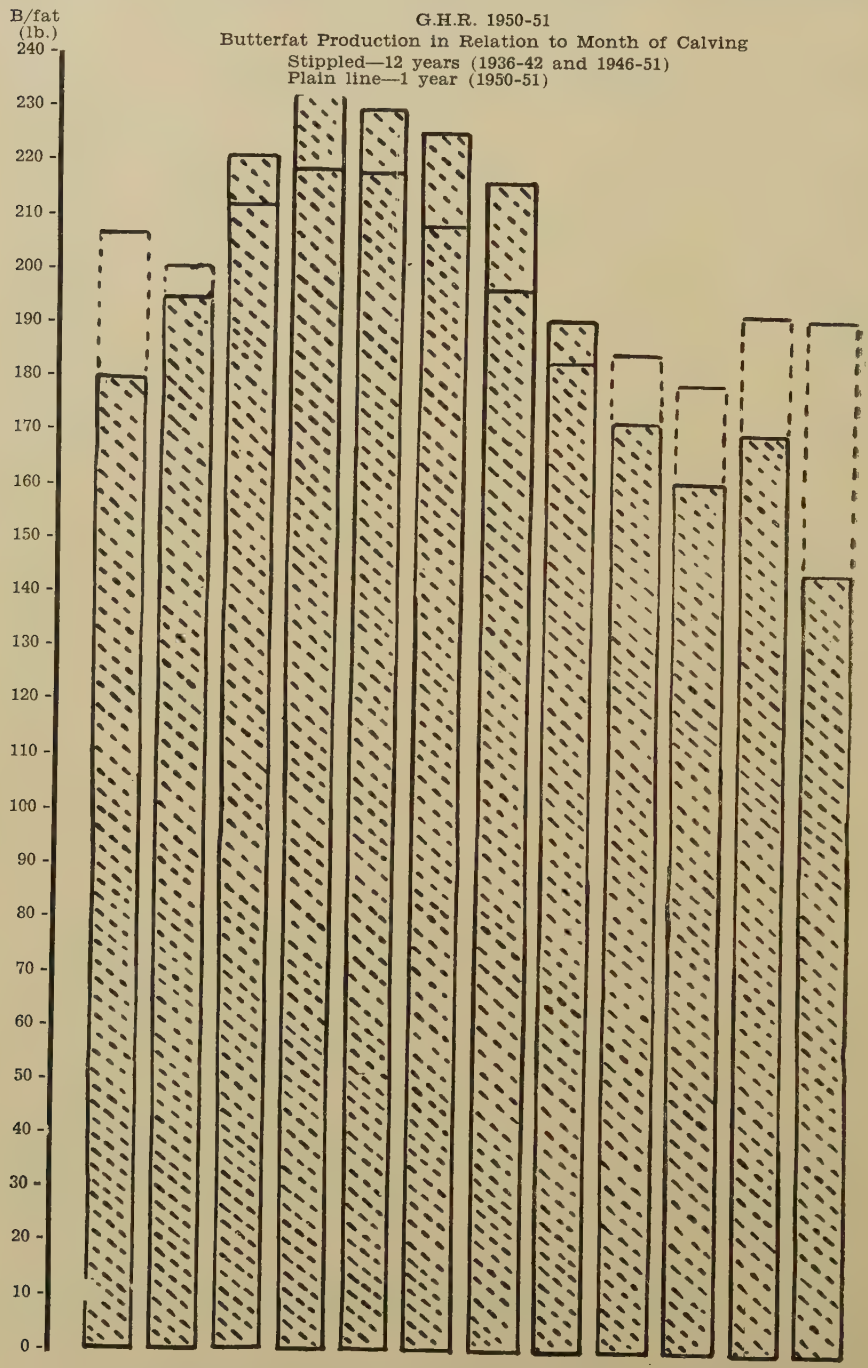
Influence of Month of Calving on Yield.

Information regarding the influence of month of calving on production of cows in complete lactations has been collected now for many year and published yearly since 1936. The general finding has been that cows calving in March, April, May, June and July produce at a higher level than cows calving in other months of the year.

The present year's findings agree in general with the earlier published recommendations of this Department, but give an undue emphasis also to November, December and January. This is believed to be since a large proportion of the cows calving in these three months are in the whole milk units of Armadale, Capel, Pinjarra, Harvey, Brunswick and Waroona, and these units have higher average production than many other units.

It is proposed in a separate study at some future date to separate the State into zones having comparable environmental and other conditions, and so determine if the one recommendation is applicable to the State as a whole.

Findings for a number of years, including over 90,000 lactations, are shown in Table 9, and diagrammatically in the accompanying graph which allows a ready appreciation of the importance of bringing the cows in during the months already mentioned.



G.H.R. 1950-51
Butterfat Production in Relation to Month of Calving
Stippled—12 years (1936-42 and 1946-51)
Plain line—1 year (1950-51)

	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
*	1,233	1,959	6,249	16,361	18,010	16,636	14,830	9,238	4,888	2,695	1,317	971
†	132	174	714	2,481	2,585	1,853	1,489	974	506	311	171	111

* No. of lactations in 12-year period.
† No. of lactations in 1950-51.

Table 9.

PRODUCTION OF COWS ACCORDING TO MONTH OF CALVING.

(Complete Lactations.)

Month.	1950–51.		1936–42 and 46–51 (9 years)	
	No. of Lactations.	Average Butterfat. (lb.)	No. of Lactations.	Average Butterfat. (lb.)
January	132	208·6	1,233	181·1
February	174	202·4	1,959	195·6
March	714	214·2	6,249	224·2
April	2,481	220·3	16,361	235·2
May	2,585	219·0	18,010	231·9
June	1,853	209·3	16,636	225·7
July	1,489	197·6	14,830	217·2
August	974	184·5	9,238	191·4
September	506	187·3	4,888	172·1
October	311	180·2	2,695	163·0
November	171	194·9	1,317	171·0
December	111	193·4	971	144·8
Total	11,501	208·1	94,387	216·3

Causes of Herd Wastage.

As has now become part of the regular routine, herd wastage was recorded by the tester at each visit to each farm together with a reason for the wastage.

This has been collected and collated and is shown as Table 10 of this article.

It must be stressed that in the present year wastage covers only 10 months, from May to February inclusive, since the recording year was shortened during the year under review.

Total disposals, wastage, etc., in the 10 months represented 15.5% of all cows which were in the herds at the beginning of the season. This is of the same general order as the figure of 17.5% found for the 1948-1949 season and the 14% wastage found for the 1949-1950 season.

Of the 15.5% total disposals, wastage, etc., 1.3% were sold for dairying and so were not lost to the industry. It is pleasing to note that of the remaining 14.2%, 9.8% were culled from the herds because of low production. That is, two thirds of all cullings were for low production and other wastage including disease, and all other causes accounted for only 4.4% of cows in the herds. The apparent low incidence of disease suggests that it should be possible to improve the herds by culling for other factors such as low production and various defects and so bring about improvement in herd quality.

TABLE 10.

HERD WASTAGE (IN 10 MONTHS).

	Unit Letter.	No. of Cows in Unit.			Total Disposals Wastage, etc.	Reason for Disposal.									
						Sold for Dairying.	Low Production.	Disease.				Other Causes.			
		A. Class.	B Class.	Total.				Udder Troubles.	Abortion and Sterility.	T.B.	Other Diseases.	Accident or Injury.	Old Age.	Other Causes.	Sundry Deaths.
Albany	T	392	4	396	68	3	54	4	2	....	....	1	....	3	1
Albany, West	A*	472	10	482	71	3	34	7	20	....	2	1	2	1	1
Armadale	Z	798	25	823	128	1	95	6	8	12	1	1	....	....	4
Balingup	M	631	....	631	127	1	81	1	17	....	1	1	9	15	1
Bridgetown	N	644	3	647	161	36	70	3	10	....	....	1	17	3	21
Brunswick	D	774	18	792	109	1	90	2	1	....	....	....	4	6	5
Capel	C*	1,086	7	1,093	196	1	183	1	....	....	....	1	5	1	4
Collie-Darkan	E*	553	16	569	25	3	18	3	....	....	....	....	....	....	1
Cowaramup	G	593	3	596	66	....	51	8	....	....	....	....	3	4	....
Denmark	W	487	7	494	67	7	31	14	2	....	4	7	2	....	....
Donnybrook	L	580	7	587	53	6	32	7	....	....	3	2	1	2	....
Forest Grove	K	602	29	631	77	....	58	3	5	2	2	1	3	2	1
Harvey	C	1,061	57	1,118	237	....	167	15	20	22	....	1	1	....	11
Karridale	D*	733	38	771	185	10	162	5	5	....	....	....	....	3	....
Manjimup	O	692	19	711	98	58	27	....	....	....	....	2	3	2	6
Margaret River	I	468	20	488	34	....	29	1	2	....	1	....	....	....	1
Metricup	F	641	26	667	85	....	75	....	1	....	2	3	....	1	3
Mt. Barker	S	710	8	718	150	2	109	2	3	....	2	3	15	9	5
Nannup	U	533	39	572	70	13	22	21	....	....	3	1	2	5	3
Northcliffe	X	589	3	592	72	17	41	4	1	....	....	3	1	2	3
Pemberton	P	565	5	570	152	24	85	8	22	....	....	2	1	5	5
Pinjarra	A	779	47	826	173	30	72	18	24	....	1	4	5	17	2
Rosa Brook	J	536	10	546	39	3	22	6	2	....	....	....	3	....	3
Ruabon	E	755	18	773	110	....	62	27	13	....	....	....	1	3	4
Scotsdale	Y	474	17	491	98	6	65	6	1	....	1	4	2	4	9
Vasse-Jindong	V	699	26	725	84	8	50	14	2	....	....	....	2	5	3
Walpole	B*	474	31	505	35	2	27	1	....	....	....	....	2	2	1
Waroona	B	640	14	654	112	1	13	2	4	92	....	....	....	....	....
Wilga	R	549	5	554	73	3	39	6	13	....	....	1	1	8	2
Totals	....	18,510	512	19,022	2,955	239	1,864	195	178	128	23	40	85	103	100
Percentage	....	97·4	3·6	100·0	15·5	1·3	9·8	1·0	0·9	0·7	0·1	0·2	0·4	0·5	0·5

* Inverted.

Influence of Butterfat Percentage on Yields of Herds.

As in previous years the average production of cows has been segregated according to the average butterfat percentage of the herds. This information covering the last three years is shown in Table 11.

TABLE 11.

AVERAGE PRODUCTION OF HERDS (COMPLETE LACTATIONS).

Grouped According to Average Test of Herd. 1948/49—1950/51 (3 years).

Test. %	No. of Herds.	No. of Cows.	Average Milk (lb.)	Average Test.	Average Butterfat (lb.)
3·5 or less	24	499	6,310	3.45	217.4
3·6–4·0	307	8,011	5,101	3.90	198.9
4·1–4·5	654	14,064	4,732	4.28	202.1
4·6–5·0	427	8,469	4,598	4.75	218.3
5·1–5·5	93	1,456	4,868	5.22	254.0
5·6 and over	12	219	4,120	6.02	247.7

Herds testing between 3.6% and 4.0% averaged 198.9 lb. of butterfat and herds averaging over 5% averaged approximately 250 lb. of butterfat. No effort was made to separate the herds into breeds and consequently the association between butterfat percent. and total butterfat is not as good as might be expected. The herds with average tests of 3.5% or less consisted almost entirely of Friesians and were largely in the whole milk zone where some hand feeding is economically possible. These herds produce at a relatively high level which explains the apparent discrepancy at this end of the table.

It is reasonable to assume that within the one breed, an increase in the butterfat percentage of the herd is accompanied by an increase in average yield of butterfat. Whether at the same time there is a decrease in milk yield is something which requires further investigation. The table would suggest that there is but the same finding, may not eventuate if the herds were segregated according to breed. Unfortunately with grade herds it is almost impossible to determine the breed of a number of cows and this makes further analysis very difficult.

Proved Bulls.

In Table 12 is an incomplete list of bulls with six or more daughters completing lactation in the 12 months. The list is necessarily incomplete and unofficial since this Department has not yet got a full scale bull proving programme under way.

Identification of heifer calves from pure bred bulls is continuing, but no scheme has been inaugurated since final decision has not been reached with the other States concerning the form the Proven Sire Index is to take.

TABLE 12. BULLS WITH 6 OR MORE DAUGHTERS COMPLETING LACTATION.

Bull.	Breed.	Daughters.										Unit.	Owner.	Age of Bull.
		2-year-old.		3-year-old.		4-year-old.		Mature.		Total.				
		No.	Average Butter-fat.	No.	Average Butter-fat.	No.	Average Butter-fat.	No.	Average Butter-fat.	No.	Average Butter-fat.			
			lb.		lb.		lb.		lb.		lb.			
Eungella Golden Starbright	Jersey	....	....	1	375	5	366	....	....	6	367·3	Pinjarra	Abbott, T. O.	Dead
Carydale Royal Descent	do.	....	....	7	377	1	365	1	437	9	351·4	Vasse	Patterson, A. F.	do.
Dunmore David	Friesian	....	....	....	....	2	279	4	339	6	319·3	Nannup	Scott, V.	11
Radyr Park Commander	Jersey	2	233	11	295	....	....	2	340	15	293·2	Vasse	Patterson, A. F.	Dead
Glanavon Maestro	A.I.S.	1	229	....	....	2	303	10	298	13	293·2	Metricup	Bell, D. H.	do.
Newstead Royal Sun	do.	....	....	1	267	1	261	14	298	16	292·9	do.	do.	10
Tipperary Reflection	do.	....	....	8	291	....	....	....	....	8	290·6	Pinjarra	Beacham, R.	Dead
Parkview Sapper	do.	4	293	4	284	....	....	....	....	8	288·5	Metricup	Bell, D. H.	6
Valliere General	do.	....	....	....	....	3	267	3	301	6	284·0	Capel	Bentley, M. G.	8
Koojan Ace's Radiance	Guernsey	2	296	6	273	4	283	....	....	12	280·0	Forest Grove	Oldfield, J. H.	9
Sabina Vale Robeson	Jersey	....	....	....	....	....	....	9	277	9	276·8	Cowaramup	Whyte, Mrs. A.	Dead
Barrowdale Lucky Lad	do.	1	190	2	270	2	211	3	349	8	274·6	Albany	Hawley Bros.	10
Travalgan Fashion Plate	do.	....	....	2	216	2	265	6	295	10	273·3	Donnybrook	Frost, A. C.	11
Wattle Hill Saar King	A.I.S.	....	....	8	283	2	296	1	318	11	271·9	Ruabon	Oates, F. J.	Dead
Ardersier Sir Charles	Jersey	....	....	7	290	....	....	2	267	9	272·8	Pinjarra	Beacham, R.	do.
Glanavon Lord	A.I.S.	1	238	8	281	11	261	1	213	21	269·9	Nannup	Maidment, S. C.	6
Summerlea Scientist	do.	....	....	....	....	....	....	10	270	10	269·8	Cowaramup	Dempster, A. W.	Dead
Moorlands Golden Duke	Jersey	....	....	2	199	1	325	5	286	8	269·1	do.	Miller, A.	10
Walgett Golden Prince	do.	2	246	5	266	4	281	....	....	11	268·3	Brunswick	Poad, W. V.	10
Cleeve Avon Cobber	Friesian	3	271	1	192	3	277	1	274	8	263·9	Harvey	Byrd, F.	Dead
Grassvale Nora's Chief	Jersey	....	....	....	....	....	....	10	263	10	262·8	Brunswick	Poad, W. V.	do.
Wattle Creek Bernard	A.I.S.	2	236	2	230	1	252	5	261	10	248·9	Bridgetown	Moyes, H. S. & E. D.	9
Basildene Baronet 3rd	do.	5	247	3	187	1	225	4	295	13	246·1	Margaret River	Wickham, W. B.	Dead
Lansdowne Ferdinand	Guernsey	....	....	....	....	1	260	6	243	7	244·9	Forest Grove	Oldfield, J. H.	do.
Brookfield's Bachelor	do.	2	171	....	....	2	265	9	254	13	244·0	Margaret River	Wickham, W. B.	do.
Colmyn Golden 3rd	Jersey	....	....	....	....	....	....	11	241	11	241·5	Metricup	Mutimer, A. S.	do.
Chenar Reward	do.	....	....	2	199	2	225	2	285	6	236·5	do.	do.	do.
Travalgan Banker	do.	5	248	6	221	....	....	....	....	11	233·0	Balingup	Brennan, M.	7
Koojan Monogram	Guernsey	....	....	....	....	....	....	7	232	7	231·7	Pemberton	Barnsby, G. H.	Dead
Denmark Dawn's Goldseeker	do.	3	177	4	216	8	223	9	250	24	226·4	Albany, West	Farr Bros.	12
Grantham Marchalong	Jersey	7	192	4	198	6	249	22	235	39	225·4	Balingup	White, G.	Dead
Clovelly Trump	Guernsey	....	....	2	244	5	201	6	235	13	223·5	Northcliffe	Tink, G. F.	10
Claremont Toby	A.I.S.	2	116	3	245	2	263	....	....	7	213·4	Balingup	Scott, D.	Dead
Radyr Park Lightning	Jersey	2	177	6	241	....	....	....	....	8	212·8	Karridale	McDonald, W. A.	6
Denmark Sunray	Guernsey	....	....	3	215	1	144	5	217	9	208·5	Northcliffe	Humphries, M.	Dead
Greenfields Prince	Friesian	2	211	4	210	....	....	4	198	10	205·7	Balingup	Daniells, H. H.	9
Ilginup Monarch Kaiser	A.I.S.	7	184	4	204	4	237	....	....	15	203·4	Vasse	Avery, H. P.	Dead
Brookfield's Bulward	Guernsey	5	164	1	218	2	179	4	247	12	199·0	Albany	Jordan, L.	do.
Juadine Aristocrat	Jersey	11	193	1	272	....	....	....	....	12	199·9	Ruabon	Semmens & Sons	8
Mereworth Oxford Prince	do.	3	193	1	178	....	....	7	202	11	197·4	Balingup	Lee, A. L.	Dead
Grantham Forward March	do.	....	....	7	180	6	194	4	241	17	199·5	Waroona	Bowles & Son	do.
Koojan Ace's Sunlight	Guernsey	3	189	2	180	3	260	2	124	10	195·6	Vasse	Johnston, L.	8
Juadine Northwood Beau	Jersey	7	157	3	183	4	235	2	202	16	187·1	Balingup	Smith, F. J.	9
Ilginup Evans Oberon	A.I.S.	8	179	3	167	....	....	1	268	12	183·3	Cowaramup	Tansell & Lewis	Dead
Millvale Dandy	do.	9	183	....	....	....	....	....	....	9	183·1	do.	Dempster, A. W.	5
Summerlea Eden	do.	....	....	....	....	....	....	6	180	6	180·0	Metricup	Simpson, J.	Dead
Brackenhurst Roger	do.	....	....	6	156	4	185	4	196	14	175·8	Bridgetown	Walter, W. K.	do.
Denmark Velveteen's Reflection	Guernsey	3	113	2	161	....	....	8	201	13	174·6	Metricup	Simpson, J.	8

The most successful sire recorded in Table 12 was the Jersey bull, Eungella Golden Starbright, now deceased, and previously owned by Mr. T. O. Abbott, of Coolup. His six daughters completing test averaged 367.3 lb. of butterfat. In second place was Carydale Royal Decent, also a Jersey, and he was followed by the Friesian bull, Dunmore David.

As in recent reports the data has been segregated according to age of the daughters, and thus the necessity for using age correction factors has been circumvented.

Herds of Various Sizes.

The leading herds of various sizes are shown in Tables, 13, 14, 15 and 16. That owned by Mr. H. W. Stain, of Mount Barker, was the leading herd in the under 20 group. His 10 cows averaged 339.0 lb.

TABLE 13.

LEADING HERDS OF LESS THAN 20 COWS.

Owner.	Unit.	No of Cows.	Breed.	Average Butterfat (lb.)
Stain, H. W.	Mt. Barker	10	Guernsey	339·0
Phillips, J. J.	Brunswick	16	Jersey	299·3
Abbott, T. O.	Pinjarra	19	Jersey	298·6
Palmer, F.	Walpole	17	Jersey	282·4
Bignell, E.	Cowaramup	17	Mixed	274·9
Barry, J. M.	Scotsdale	12	Mixed	274·2
Smith A. F.	Denmark	18	Mixed	270·2
Read, M.	Vasse	20	Guernsey	268·1
Kingdom, H. R.	Denmark	14	Mixed	266·2
Jackman, L.	Armadale	15	Friesian	265·5
Atherton & Sons	Donnybrook	10	Jersey	265·0
Smith, W. J.	Scotsdale	14	Guernsey	263·4
Lange, G. E.	Denmark	14	Jersey	255·6
Burton, J.	Walpole	16	Mixed	250·1

TABLE 14.

LEADING HERDS OF 20 TO 30 COWS.

Owner.	Unit.	No. of Cows.	Breed.	Butterfat Average. (lb.)
Jarvis, J.	Donnybrook	22	Jersey	348·5
Burton, P. A.	Walpole	26	Mixed	321·7
Gibbs, A. L.	Cowaramup	23	Mixed	312·4
Leonhardt, H.	Brunswick	21	Mixed	296·2
Frost, A, C.	Donnybrook	22	Mixed	295·1
Scott, V.	Nannup	20	Friesian	292·0
Chapman, K.	Wilga	24	Guernsey	281·3
Anning, A. F.	Walpole	20	Mixed	281·2
Minchin, R. S.	Northcliffe	22	A.I.S.	274·4
Foan, O.	Donnybrook	24	Jersey	271·8
Worsfold, F. M.	Albany West	21	A.I.S.	271·3
Sanders & Son	Northcliffe	22	Mixed	269·0
Leach, F. C.	Waroona	26	A.I.S.	267·8
Hawley Bros.	Albany	25	Jersey	263·8
Middleton, W.	Denmark	22	Jersey	260·0
Wood, R. H.	Bridgetown	20	Mixed	253·3
Earl, R. H.	Cowaramup	28	Mixed	253·2
McDonald, W. A.	Karridale	29	Mixed	253·0

TABLE 15.

LEADING HERDS OF 31 TO 50 COWS.

Owners.	Unit.	No. of Cows.	Breed.	Average Butterfat (lb.)
Noakes, E. G.	Forest Grove	38	Mixed	302·4
Cunningham, A. W.	Armadale	32	Friesian	299·8
Scott, A. E.	Capel	32	Friesian	291·7
Benson, R. C.	Donnybrook	31	Jersey	291·0
Holben, E. A.	Cowaramup	33	Jersey	287·3
Heathcote, C. & V.	Northcliffe	35	Mixed	282·3
Paterson, F. C. & J. C.	Pinjarra	46	A.I.S.	276·8
Clifton, F. N.	Capel	40	A.I.S.	276·7
Smith, F. C.	Denmark	32	Mixed	276·1
Patterson, A. J.	Vasse	44	Jersey	275·8
Puls Bros.	Albany West	32	Mixed	270·3
Maidment, S. C.	Nannup	46	Mixed	264·2
Bell, R. W.	Forest Grove	38	Mixed	264·2
Colum, P. J.	Waroona	36	A.I.S.	262·9
Bashford, J.	Northcliffe	37	Guernsey	261·7
Whyte, Mrs. A.	Cowaramup	38	Jersey	253·8
Brennan, M.	Balingup	32	Mixed	250·7

TABLE 16.

LEADING HERDS OF 51 COWS OR MORE.

Owner.	Unit.	No. of Cows	Breed.	Average Butterfat. (lb.)
Pugh & Son	Mt. Barker	66	Red Poll	290·8
Bell, D. H.	Metricup	54	A.I.S.	285·4
Beacham, R.	Pinjarra	60	Mixed	272·1
Butler Bros.	Walpole	63	Mixed	252·0
Norton Bros.	Capel	118	A.I.S.	246·8
Oates, F. J.	Ruabon	59	A.I.S.	246·7
Fry, S. G.	Harvey	91	A.I.S.	230·5

In the group 20-30 cows, Mr. J. Jarvis, with 22 cows averaging 348.5 lb., occupied first place, and had the highest producing herd under test irrespective of size.

In the group 31-50 cows, Mr. E. G. Noakes, of Forest Grove, had 38 cows averaging 302.4 lb., whilst in the 50 and over group, Messrs. Pugh and Son occupied first place with 66 cows averaging 290.8 lb.

Highest Producing Cow.

In Table 17 is shown the highest producing cow in each unit. Pride of place is occupied by a Jersey cow owned by O. Foan, of Donybrook; she produced 9,240 lb. of milk with a 5.8% test and 542 lb. of butterfat in 273 days.

Second place was occupied by a Guernsey owned by D. Della, of Pemberton; she produced 537 lb. of butterfat.

Table 17.
THE HIGHEST PRODUCING COW IN EACH UNIT.

Name of Owner.	Unit.	Name of Cow.	Breed.	Milk lb.	Test %	Butter-fat lb.
Foan, O.	Donnybrook	Brownie	Jersey	9,240	5·8	542
Della, D.	Pemberton	Adelaide 2nd	Guernsey	9,939	5·4	537
Holben, E. A.	Cowaramup	Pixie	Jersey	11,073	4·7	531
Burton, P. A.	Walpole	Dora	Jersey x Guernsey	9,156	5·3	493
Reid, J. W.	Capel	Mona	A.I.S.	10,650	4·4	473
Cunningham, A. W.	Armadale	Smoky	Friesian	11,637	4·0	468
Sanderson, K.	Northcliffe	Brindle	Jersey x Guernsey	9,338	4·9	463
Patterson, A. J.	Vasse	Stella	Jersey	7,680	5·9	458
Colum, P. J.	Waroona	Topsy	A.I.S. x	10,542	4·3	454
Paterson, F. C. & J. C.	Pinjarra	Brindle	A.I.S. x	10,080	4·4	453
Edwards, P. J.	Brunswick	Teddy	Guernsey x A.I.S.	8,829	5·0	446
Chapman, K.	Wilga	Wildy	Jersey	8,658	4·6	444
Smith, A. F.	Denmark	Cherry	A.I.S.	7,980	5·5	440
Noakes, E. G.	Forest Grove	Betty	Guernsey	8,931	4·8	437
Workman, E.	Harvey	Rosy	A.I.S.	11,400	3·8	437
Pugh & Son, F. R. H.	Mt. Barker....	Olive	Guernsey	7,989	5.4	432
Smith, W. J.	Scotsdale	Madge	Guernsey	8,727	4·8	422
Langridge, T.	Metricup	Curley	Jersey	9,458	4·4	421
Allwood, F.	Albany	Gilly	Guernsey	7,284	5·6	413
Coombe, E. A.	Albany West	Molly	J. x A.I.S.	11,070	3·6	402
Patmore, W. D.	Karridale	Princess	Shorthorn x Jersey	7,710	5·1	395
Wood, A. W. A.	Margaret River	Molly	Guernsey x	8,562	4·5	392
Oates, F. J.	Ruabon	Shirley	A.I.S. x	8,376	4·7	392
Teasdale, W. H.....	Rosa Brook	Mabel	....	8,700	4·4	391
Ellis, H.	Balingup	Blossom	Jersey	7,041	5·3	374
Cogden, A. E.	Bridgetown	Nigger	Jersey x	8,115	4·5	366
Scott, V.	Nannup	Dot	Friesian	10,823	3·3	366
Morey, E.	Manjimup	Ruffy	A.I.S.	8,013	4·2	341
Morley, H.	Collie	May	Guernsey	7,453	4·6	349

Co-operative Dairy Farmers' Trophy.

The Co-operative Dairy Farmers' Trophies are the only trophies now awarded on the results of Grade Herd Recording and they are presented jointly by the South-West Co-operative Dairy Farmers of Bunbury, and the Great Southern Co-operative Butter Co., of Narrogin.

Points are allotted on a scale designed to give greater weight to an increase in one year over that of the previous year where the herd was already at a high level.

Awards are issued to:—

1. The herd obtaining the most points for increase over the previous year in each unit.
2. The herd amongst those in Group 1 which obtains the greatest number of points—i.e., the greatest number of points over all units.
3. The herd for the State as a whole showing the greatest aggregate of points allotted on results of the three latest years of Grade Herd Recording.

Awards in the various units are shown in Table 18. It will be noticed that J. Jarvis, of Donnybrook, with 41.33 points for increase over production of the previous year, won the State award.

TABLE 18.

Owner.	Unit.	Average Butterfat Production.		Points Scored.
		1949–50.	1950–51.	
		lb.	lb.	
Jarvis, J.	Donnybrook	287	349	41·33
Stain, H. W.	Mt. Barker	295	339	39·33
Burton, P. A.	Walpole	282	322	26·67
Watterson, W. G.	Karridale	76	193	23·40
Lange, B. E.	Albany	133	239	21·20
Wood, R. H.	Bridgetown	169	253	21·00
Smith, F. C.	Denmark	207	276	19·71
Gibbs, A. L.	Cowaramup	263	312	19·60
Marshall, R. J.	Scotsdale	151	226	18·75
Summerfield, C.	Margaret River	174	243	17·25
Coombe, H. T.	Albany, West	153	220	16·75
Guy, W.	Wilga	160	225	16·25
Trease, H. L.	Northcliffe	181	241	15·00
Abbott, T.	Pinjarra	277	299	14·67
Gubler, C.	Balingup	164	217	13·25
Teasdale, W. H.	Rosa Brook	191	240	12·25
Hornibrook, J.	Capel	171	219	12·00
Leaver & Sons, F. W.	Armadale	211	250	11·14
Dillon, F.	Brunswick	168	210	10·50
Scott, V. G.	Nannup	266	292	10·40
Waugh, C. J.	Pemberton	118	164	9·20
Burge, C. J. T.	Vasse	142	187	9·00
Ward, G. W.	Waroona	148	190	8·40
Radford Park Co.	Metricup	114	153	7·80
Kemp, G.	Ruabon	198	225	6·75
Hopkins, R.	Harvey	151	170	4·75
Noakes, E. G.	Forest Grove	298	302	2·67
Kennedy, A.	Collie-Darkan	....	215	1st year
Hall, R.	Manjimup	....	198	do.

The trophy awarded to cover increase in production over the four year period is considered to be the major award. It was won in this instance by Mr. E. G. Noakes, of Forest Grove, as may be seen from Table 19.

TABLE 19.

Owner.	Average Butterfat Production.				Points Scored.
	1947–48.	1948–49.	1949–50.	1950–51.	
Noakes, E. G., Forest Grove	202	292	298	302	32·38
Bashford, J., Northcliffe	162	256	263	262	25·90
Abbott, T., Pinjarra	215	299	277	299	24·00
Bignell, E., Cowaramup	205	273	246	275	20·00
Moore, C. G., Northcliffe	109	195	200	199	18·20
Ferguson-Stewart, E. R., Brunswick	179	178	226	244	16·89

His average production has shown a steady increase over the four years and his was a very meritorious performance, permitting him to score 32.38 points. Mr. J. Bashford, of Northcliffe, with 25.90 points is in second place and was followed by Mr. T. Abbott, of the Pinjarra unit.

Average Yields of Individual Herds.

The average performances of each herd in the various units are shown in the following sections; only the leading three herds in each unit are identified by name and the remainder by a herd letter. The averages include all cows tested for 90 days or more in the 12 months, whether the lactations were complete or incomplete.

The average performances of each herd in the various units are as follows:—

ALBANY T

Herd.	No. of Cows.	Milk Average. lb.	Butter-fat Average. lb.
Hawley Bros.	25	5,263	263·8
Robinson Bros.	14	5,438	246·0
Lange, B. D.	12	4,704	239·3
Herd E*....	15	5,550	231·0
„ Z	26	4,964	229·5
„ A	27	4,324	223·6
„ AB	8	4,616	211·1
„ M	27	4,378	196·1
„ B	24	3,827	177·8
„ H	43	3,555	177·4
„ K*	11	4,332	171·9
„ SF	40	3,823	154·1
„ AD	19	3,473	151·8
„ G	11	2,910	144·2
„ B*	15	2,529	123·3
„ V*	31	2,739	116·2
„ Y*	14	2,603	114·3
„ C*	11	2,268	108·3

ARMADALE Z.

Herd.	No. of Cows.	Milk Average. lb.	Butter-fat Average. lb.
Cunningham, A. W.	32	8,191	299·8
Jackman, L	15	6,388	265·5
Blomfield, B. G.	32	5,638	249·9
Herd H	73	6,380	249·7
———	2	4,657	248·0
„ K	29	5,255	213·6
„ G	65	5,430	209·9
„ P	26	4,593	198·2
„ N	11	4,593	197·1
„ O	47	5,089	194·3
„ F	25	4,647	192·3
„ M	65	4,737	187·8
„ C	44	4,712	186·4
„ V	44	4,823	184·9
„ J	35	4,274	176·9
„ T	30	4,215	173·7
„ S	38	4,358	166·9
„ W....	40	4,130	164·4
„ U	8	3,532	160·1
„ P	20	3,130	155·9
„ E	12	3,210	148·5
„ R	17	3,758	139·4
„ Y	25	3,650	128·1

ALBANY WEST A*.

Herd.	No. of Cows.	Milk Average. lb.	Butter-fat Average. lb.
Worsfold, F. M.	21	6,882	271·3
Puls Bros.	32	6,492	270·3
Hortin, F. V.	25	5,487	242·8
Herd P	18	5,656	238·0
„ J	15	5,166	233·4
„ M	23	4,490	229·6
„ S	16	5,099	220·1
„ B	20	5,410	218·2
„ E	18	4,652	218·1
„ F	50	4,545	215·1
„ U	13	4,461	204·2
„ Z	16	4,731	196·3
„ K	14	4,275	193·8
„ U	14	4,113	182·3
„ C	28	4,003	164·2
„ N	14	3,388	162·4
„ T	26	3,813	159·8
„ H	11	3,791	152·8
„ D	36	3,428	140·5
„ R	16	2,878	114·7
„ G	17	2,832	106·9

BALINGUP M.

Herd.	No. of Cows.	Milk Average. lb.	Butter-fat Average. lb.
Brennan, M.	32	5,357	250·7
Ellis, H.	25	4,939	233·3
Bette, J.....	25	4,932	232·2
Herd BE	21	5,025	229·7
„ CF	36	5,506	229·6
„ BA	39	5,269	221·2
„ A	38	4,930	221·0
„ BG	20	4,726	217·9
„ BN	11	4,446	217·2
„ EW	35	4,880	214·2
„ BM	27	5,430	213·4
„ N	48	4,613	213·4
„ EL	22	4,694	205·3
„ CH	38	3,825	193·1
„ C	24	4,526	192·7
„ DA	29	4,639	188·9
„ CB	12	4,248	186·9
„ BK	26	3,243	153·3
„ CD	51	3,742	137·4
„ EC	38	3,476	135·5
„ CA	22	2,583	105·8

* Inverted

BRIDGETOWN N.

Herd.	No. of Cows.	Milk Average.	Butter-fat Average.
		lb.	lb.
Wood R. H.			
Herd IV	20	5,373	253·3
Williams, J. C.			
Herd W	28	4,552	235·9
Noyes, H. S. &			
E. D. R	30	6,186	233·8
Herd IA	30	4,866	220·9
„ R*	18	4,454	219·7
„ F*	38	4,873	219·7
„ AB	33	5,318	216·5
„ ID	27	4,932	209·0
„ AC	14	4,572	208·1
„ A*	16	4,399	203·8
„ E*	14	3,347	194·4
„ AE	20	3,999	194·1
„ Q	43	4,663	187·7
„ Y	20	4,030	182·0
„ Z	31	3,427	181·6
„ IK	20	3,819	180·1
„ B*	39	3,343	169·0
„ IN	43	3,671	168·5
„ IK	23	3,788	163·6
„ IS....	16	3,885	156·5
„ V	44	2,966	137·8
„ IX	21	3,270	128·9
„ AD	26	2,939	126·5
„ L*	11	2,469	107·2

BRUNSWICK D.

Herd.	No. of Cows.	Milk Average.	Butter-fat Average.
		lb.	lb.
Phillips, J. J.	16	5,935	299·3
Leonhardt, H.	21	6,480	296·2
Poad, W. V.	37	5,194	249·1
Herd X	27	5,684	244·0
„ J	47	4,576	243·5
„ F	35	5,101	243·4
„ N	43	5,034	222·2
„ W*	39	4,815	217·6
„ A*	23	4,551	213·9
„ O	23	4,869	212·3
„ Y*	28	4,642	211·7
„ C*	46	5,434	209·8
„ Z	33	4,020	201·4
„ K*	27	4,092	194·6
„ P*	35	4,346	190·1
„ R*	38	4,356	188·7
„ V*	43	4,361	185·5
„ T*	32	4,220	174·6
„ Q*	35	3,747	173·1
„ T	30	2,825	158·1
„ G*	33	3,410	155·0
„ Y	31	1,990	91·4

CAPEL C.*

Herd.	No. of Cows.	Milk Average.	Butter-fat Average.
		lb.	lb.
Scott, A. E.	32	7,582	291·7
Clifton, F. H.	40	6,705	276·7
Norton Bros.	118	6,055	246·8
Herd N	48	6,397	245·3
„ L*	34	6,093	233·2
„ W	61	5,553	242·6
„ F	28	6,266	240·6
„ A	35	5,894	229·5
„ T*	54	4,978	221·5
„ P	55	6,317	220·0
„ O	36	5,642	218·7
„ B*	61	5,410	217·6
„ G	63	5,151	214·8
„ Q	79	5,394	212·2
„ S	49	4,872	209·3
„ V	20	5,151	200·7
„ Z	53	4,859	195·5
„ U	35	4,974	190·3
„ A*	61	4,145	160·0
„ D	48	3,537	159·1
„ K	40	3,937	157·0

COLLIE E.*

Herd.	No. of Cows.	Milk Average.	Butter-fat Average.
		lb.	lb.
Kennedy, A.	19	5,070	215·0
Weir, G.	30	4,728	212·5
Cochrane, J.	6	4,089	198·0
Herd P	49	4,514	195·2
„ M	28	4,478	193·3
„ J	27	4,080	161·4
„ A	24	3,726	160·9
„ N	12	3,742	159·6
„ G	14	3,414	153·9
„ K	18	3,570	148·9
„ O	40	3,472	147·5
„ I	16	3,829	146·4
„ E	24	4,307	144·1
„ H	25	3,616	143·5
„ D	11	3,575	142·4
„ X	2	3,105	126·0
„ Q	16	3,011	122·9
„ B	11	3,083	121·0
„ C	15	2,381	95·7
„ T	4	2,070	94·0
„ R	6	2,070	92·5
„ F	5	1,836	83·0
„ U	21	2,560	78·3
„ V	17	1,466	78·2

* Inverted.

COWARAMUP G.

Herd.	No. of Cows.	Milk Average.	Butter-fat Average.
		lb.	lb.
Gibbs, A. L.	23	6,984	312·4
Holben, E. A.	33	5,986	287·3
Bignell, E.	17	5,858	274·9
Herd F*	38	5,673	253·8
„ AA	28	5,593	253·2
„ L	33	4,953	245·3
„ W	28	5,359	240·6
„ G	40	5,772	236·9
„ F	26	5,999	232·3
„ M	26	5,358	228·0
„ D	40	5,933	227·6
„ S	20	4,464	204·5
„ P	23	5,172	203·9
„ X	47	4,711	202·2
„ O	31	3,910	195·4
„ C*	19	5,217	181·6
„ WV	31	3,927	164·9
„ K	40	3,713	163·2
„ K*	12	3,518	162·7
„ GG	15	3,420	150·9

DONNYBROOK L.

Herd.	No. of Cows.	Milk Average.	Butter-fat Average.
		lb.	lb.
Jarvis, J.	22	7,500	348.5
Frost, A. C.	22	5,137	295.1
Benson, R. C.	31	5,226	291.0
Herd L	24	5,273	271.8
„ K	10	5,059	265.0
„ H	21	5,154	242.3
„ G*	16	4,992	222.4
„ AD	15	4,182	208.2
„ F*	22	4,460	207.9
„ Y	50	5,047	202.6
„ U*	23	3,894	189.6
„ L	26	3,571	183.8
„ AB	13	3,798	179.5
„ Q*	21	3,479	171.8
„ P*	23	3,111	167.0
„ X	26	3,286	164.0
„ T*	30	4,211	161.3
„ R*	19	3,405	155.6
„ C*	30	3,697	153.5
„ J*	31	3,535	152.0
„ D*	32	3,418	151.4
„ K*	30	3,552	145.4
„ V*	17	2,775	116.2
„ AC	16	2,297	106.2

DENMARK W.

Herd.	No. of Cows.	Milk Average.	Butter-fat Average.
		lb.	lb
Smith, F. C.	32	6,156	276.1
Smith, A. F.	18	5,351	270.2
Kingdom, H. R.	14	5,986	266.2
Herd H	22	5,163	260.0
„ T*	14	4,641	255.6
„ J	17	5,711	223.2
„ P	25	4,892	220.7
„ R*	17	4,519	212.7
„ F*	19	4,222	193.0
„ Y	18	3,922	161.9
„ O	47	4,115	159.3
„ V	23	3,367	158.5
„ Q	21	3,332	148.1
„ X	18	3,267	144.2
„ K	16	2,806	127.7
„ B*	13	2,899	122.4
„ M	24	2,604	112.9
„ L*	21	2,617	110.4
„ A*	26	2,214	102.1
„ P*	26	2,124	89.6
Z	8	1,702	69.4

FOREST GROVE K.

Herd.	No. of Cows.	Milk Average.	Butter-fat Average.
		lb.	lb.
Noakes, E. G.	38	6,354	302.4
Bell, R. W.	38	6,039	264.2
Oldfield, J. H.	38	5,092	245.0
Herd AN	12	5,439	234.6
„ JN	20	4,808	225.8
„ U*	31	4,709	220.6
„ T*	29	5,217	218.5
„ AM	18	4,542	212.6
„ AJ	17	4,950	212.2
„ V*	24	4,443	197.6
„ AD	32	4,290	193.2
„ F	19	4,278	188.9
„ J	16	4,682	181.6
„ AL	15	4,270	180.9
„ AK	21	4,086	180.4
„ AQ	35	4,630	180.2
„ M	33	4,768	175.8
„ B	29	3,899	174.1
„ JO	20	3,456	163.8
„ XR	50	3,324	158.0
„ AD	20	3,485	140.3
„ AH	19	3,094	132.9
„ AP	9	1,349	53.9

* Inverted.

HARVEY C.

Herd.	No. of Cows.	Milk Average.	Butter-fat Average.
		lb.	lb.
Workman, E.	38	6,151	247.6
Eckersley, H. G.	47	4,902	241.9
Fry, S. G.	91	5,805	230.5
Herd C*	43	5,786	225.3
„ R*	36	5,688	222.0
„ R	32	4,209	214.5
„ H	61	5,287	211.6
„ V	49	5,109	206.6
„ D*	38	4,837	198.7
„ B	41	4,992	198.4
„ Z	76	5,003	197.7
„ E	44	4,657	194.3
„ E*	30	4,886	192.5
„ CC	43	4,606	185.1
„ F*	17	4,117	173.8
„ M	59	4,643	170.9
„ K*	48	4,061	170.7
„ B*	33	4,080	170.2
„ L*	19	3,733	163.7
„ K	49	4,195	163.0
„ J*	23	4,329	161.3
„ T*	20	4,117	157.9
„ P*	25	3,834	152.6
„ S	38	3,591	146.9

MANJIMUP O.

Herd.	No. of Cows.	Milk Average.	Butter-fat. Average.
		lb.	lb.
Hall, R.	29	4,806	197·6
Wheeler, R.	26	5,025	196·3
Stephenson, E.	22	4,536	192·8
Herd X	36	4,391	189·4
„ X	43	4,834	185·9
„ E*	15	3,761	183·7
„ T	26	3,934	179·6
„ F	15	3,774	175·1
„ F*	26	4,128	172·5
„ K*	32	4,095	171·8
„ V*	24	4,651	170·7
„ XQ	20	4,299	168·3
„ AF	13	3,923	165·5
„ AD	25	3,509	160·6
„ J	37	3,855	160·1
„ J*	13	3,228	159·2
„ U	43	3,933	158·8
„ XN	35	3,792	154·8
„ U*	21	3,409	143·7
„ P	30	3,909	143·1
„ M	16	3,253	140·2
„ XK	35	3,115	138·4
„ XZ	28	3,464	134·2
„ AG	19	2,930	124·6
„ B	25	2,941	120·7

KARRIDALE D*

Herd.	No. of Cows.	Milk Average.	Butter-fat Average.
		lb.	lb.
McDonald, W. A.	29	5,209	253·0
Patmore, W. D.	26	5,310	241·1
Wilson, J.	22	4,969	224·5
Herd KY*	32	4,976	223·9
„ J	11	4,712	220·4
„ F	28	4,102	203·2
„ P	30	4,407	193·5
„ H	38	5,132	192·6
„ D*	22	4,256	184·7
„ E	22	4,460	179·5
„ D	37	4,340	179·4
„ C*	24	3,535	160·0
„ I	39	3,696	157·6
„ G*	29	3,598	155·2
„ A	25	2,844	147·9
„ A*	24	3,283	143·6
„ F*	26	3,197	140·0
„ G	24	2,797	120·4
„ N	32	2,802	117·8
„ KI	24	2,669	110·7
„ K*	24	2,515	103·2
„ K	21	2,515	100·9
„ B	21	2,526	98·1
„ E*	26	2,792	119·6
„ M	18	2,397	93·8
„ L*	8	1,170	50·9

MARGARET RIVER.

Herd.	No. of Cows.	Milk Average.	Butter-fat. Average.
		lb.	lb.
Wood, A. W. A.	11	6,180	231·2
Summerfield, C.	15	4,765	243·0
Wallis, S.	27	5,720	236·9
Herd T	13	4,839	220·6
„ D	45	4,809	209·0
„ AB	25	4,376	207·0
„ W	13	4,608	204·5
„ G*	23	5,120	198·3
„ K*	27	4,803	196·2
„ P	18	4,618	194·3
„ XT	25	4,867	193·9
„ S	32	4,390	191·7
„ HF	30	4,027	185·5
„ R*	35	4,695	179·3
„ S	8	4,487	171·5
„ F*	33	3,718	171·1
„ U	22	3,490	121·9
„ C*	19	2,515	116·2
„ AB	30	2,570	112·6

* Inverted.

METRICUP F.

Herd.	No. of Cows.	Milk Average.	Butter-fat Average.
		lb.	lb.
Bell, D. H.	54	7,844	285·4
Langridge, T.	22	5,278	245·0
Briggs, D. O.	36	6,079	223·4
Herd G	27	4,735	218·0
,, GT	30	5,307	214·9
,, W	27	4,763	210·9
,, Q*	30	5,054	188·4
,, F*	26	4,894	188·1
,, GA*	33	4,176	174·0
,, P	23	3,861	171·9
,, K*	53	4,370	171·5
,, VE	56	4,240	167·3
,, VK	81	3,127	153·3
,, T*	27	3,738	150·2
,, GB*	19	3,031	137·9
,, VL*	40	3,227	128·8
,, R*	21	3,101	117·7

NANNUP U.

Herd.	No. of Cows.	Milk Average.	Butter-fat Average.
		lb.	lb.
Scott, V.	20	8,907	292.0
Maidment, S. C.	46	6,278	266.7
Warren, C. N.	33	6,002	222.2
Herd T	27	4,265	204.9
,, E	38	4,771	198.1
,, DA	42	4,796	179.4
,, AB	21	3,451	176.1
,, F	39	4,646	176.0
,, BM	37	3,284	160.0
,, E*	14	3,455	148.9
,, AE	36	3,779	145.3
,, DE	12	3,756	143.9
,, R	24	3,576	139.7
,, DC	18	3,368	134.4
,, DG	15	3,050	128.7
,, DF	20	2,617	121.6
,, DH	11	3,186	117.2
,, DJ	24	3,051	115.2
,, C	10	2,276	92.8
,, BB	25	1,986	76.0

MT. BARKER.

Herd.	No. of Cows.	Milk Average.	Butter-fat Average.
		lb.	lb.
Stain, H. W.	10	6,699	339.0
Pugh & Son	66	6,547	290.8
Trent & Son	17	4,804	232.3
Herd A*	29	5,435	231.7
,, Y	26	4,655	223.4
,, GA	16	4,541	218.1
,, Z	37	4,580	206.7
,, E	31	4,975	203.7
,, P	37	4,747	202.1
,, U*	18	4,245	199.7
,, W	22	4,114	192.9
,, B	40	4,582	192.4
,, U	69	4,713	189.7
,, EA	38	4,310	185.8
,, EM	12	3,936	184.2
,, C*	39	3,846	177.0
,, DA	21	4,043	174.9
,, D	37	3,983	166.9
,, T	32	4,310	159.3
,, AC	22	3,427	154.5
,, ED	18	3,741	149.9
,, I	33	3,320	147.5
,, DR	16	3,331	129.2

NORTHCLIFFE X.

Herd.	No. of Cows.	Milk Average.	Butter-fat. Average.
		lb.	lb.
Heathcote, C. & V.	35	5,581	282.3
Minchin, R. S.	22	6,014	274.4
Sanders & Son	22	5,795	269.0
Herd B	37	5,710	261.7
,, I	26	5,347	240.9
,, R	31	5,625	240.1
,, R*	18	4,650	236.8
,, H	18	5,400	221.2
,, AC	19	4,785	217.6
,, B*	32	4,410	209.8
,, A*	21	4,164	208.4
,, PN	21	4,096	201.3
,, M	32	4,190	199.5
,, P*	19	4,624	195.0
,, T	24	4,211	191.5
,, W	23	3,926	189.3
,, U*	30	4,230	187.9
,, AB	29	4,106	181.0
,, V*	20	4,018	179.4
,, J*	27	3,918	178.9
,, Y*	15	3,844	174.3
,, L*	21	3,348	150.8
,, T	16	1,272	48.9

* Inverted.

PEMBERTON P.

Herd.	No. of Cows.	Milk Average.	Butter-fat Average.
		lb.	lb.
Della, D.	29	5,539	249.7
Parke, C.	14	5,545	225.6
Barnsby, G. H.	16	4,196	214.7
Herd A	23	4,550	205.4
,, K	13	4,920	191.1
,, AH	23	5,238	187.9
,, G	21	4,517	168.0
,, D	31	4,271	184.5
,, AO	19	4,465	179.8
,, Y	38	4,022	174.3
,, AL	24	3,620	166.6
,, PG	32	4,032	164.2
,, C	12	3,505	159.5
,, M	24	3,539	151.6
,, AM	36	3,634	148.5
,, AD	11	3,062	142.7
,, AL	11	3,299	137.5
,, Z	12	3,240	128.5
,, AN	27	3,363	127.2
,, AB	26	3,418	125.1
,, AA	16	2,855	122.6
,, A1	29	2,792	113.4
,, AT	14	2,522	109.7
,, L	17	2,404	105.5
,, AE	17	2,984	100.4
,, U	7	2,066	78.6

PINJARRA A.

Herd.	No. of Cows.	Milk Average.	Butter-fat Average.
		lb.	lb.
Abbott, T. O.	19	5,975	298.6
Paterson, F. C. & J. C.	46	6,504	276.8
Beacham, R.	60	6,268	272.1
,, V	35	5,664	238.6
,, P	34	5,736	232.2
,, P*	33	5,439	227.3
,, Z	57	5,572	226.5
,, D*	23	4,647	226.2
,, X	49	5,731	217.5
,, T	22	4,528	200.4
,, C*	38	4,452	190.1
,, L*	21	4,173	186.6
,, T*	26	4,267	184.0
,, G*	61	4,660	177.6
,, K*	32	4,657	177.4
,, O	20	3,981	168.4
,, Y*	50	3,897	158.0
,, K	34	3,657	154.2
,, F*	15	3,798	153.0
,, F	32	4,131	152.4
,, E*	18	2,784	113.2
,, R*	3	1,630	60.3

ROSA BROOK J.

Herd.	No. of Cows.	Milk Average.	Butter-fat Average.
		lb.	lb.
Doak, F.	17	5,262	243.9
Teasdale, W. H.	20	5,331	240.0
Elliott, W. S.	23	5,321	224.5
,, X	45	4,721	210.9
,, W	24	4,764	206.2
,, Y	30	4,298	205.0
,, AV	15	4,815	197.5
,, F	29	5,283	193.2
,, AC	23	3,955	184.6
,, L	28	4,615	181.8
,, AF	31	4,270	178.9
,, AE	40	2,888	163.3
,, AN	25	3,552	141.4
,, C*	31	3,090	139.5
,, G*	23	2,934	135.4
,, AG	30	2,859	122.1
,, K	26	3,027	121.8
,, AK	16	2,507	95.4
,, AG	17	2,228	93.6

* Inverted.

RUABON E.

Herd.	No. of Cows.	Milk Average.	Butter-fat Average.
		lb.	lb.
Oates, F. J.	59	6,167	246.7
Kemp, G.	35	5,728	225.4
Manning, H.	44	6,350	215.3
Herd V	36	5,266	204.8
„ C	17	5,375	203.7
„ B*	28	4,536	195.7
„ R	46	4,611	189.8
„ K*	26	4,531	189.3
„ H	35	4,805	188.5
„ AC	38	4,548	183.2
„ A*	12	4,406	181.7
„ DB	44	4,642	172.5
„ Q	30	4,337	171.0
„ I	51	3,751	166.8
„ P*	48	4,357	165.7
„ Y*	25	4,011	160.6
„ AD	39	4,302	160.0
„ G*	46	3,373	137.2
„ AB	18	3,184	135.7
„ D	28	2,480	98.1

SCOTSDALE Y.

Herd.	No. of Cows.	Milk Average.	Butter-fat Average.
		lb.	lb.
Barry, J. M.	12	6,146	274.2
Smith, W. J.	14	5,801	263.4
Marshall, R. J.	22	5,017	226.4
Herd W	14	4,975	223.8
„ S	10	4,100	220.1
„ C*	12	4,059	209.0
„ E*	22	4,827	218.3
„ A	18	4,742	203.9
„ K*	27	4,298	201.1
„ V	19	4,200	189.7
„ B	15	3,719	184.8
„ N	32	3,978	183.1
„ B*	28	3,823	174.1
„ I	19	3,730	172.2
„ V	18	4,084	167.8
„ M	22	3,532	161.5
„ X	30	3,615	150.8
„ Q*	6	7,566	148.7
„ J	39	3,398	148.6
„ I*	22	3,256	135.4
„ L*	28	2,984	135.2
„ R*	24	2,858	121.1

VASSE-JINDONG V.

Herd.	No. of Cows.	Milk Average.	Butter-fat. Average.
		lb.	lb.
Patterson, A. J.	44	5,910	275.8
Read, M.	30	5,726	268.1
McGregor, R.	25	5,285	242.6
Herd T*	34	4,417	228.5
„ F*	35	5,472	227.4
„ AC	26	5,884	219.5
„ G	26	4,298	213.0
„ A*	41	4,890	208.1
„ P*	22	5,089	204.0
„ Q	51	4,968	197.9
„ AG	47	4,358	197.3
„ R*	31	4,919	189.0
„ D*	19	4,684	187.0
„ F	29	4,124	186.1
„ C*	25	4,724	180.4
„ A*	37	3,822	177.3
„ J*	25	4,056	176.0
„ K*	29	3,436	164.2
„ AE	20	3,915	153.2
„ W	34	3,455	148.2
„ AD	32	3,209	140.0

* Inverted.

WALPOLE.

Herd.	No. of Cows.	Milk Average.	Butter-fat Average.
		lb.	lb.
Burton, P. A.	26	6,642	321.7
Palmer, F.	17	5,320	282.4
Anning, A. F.	20	6,185	281.2
Herd W....	63	5,535	252.0
,, S	16	5,083	250.1
,, F	18	5,117	247.9
,, N	18	5,184	241.5
,, V	31	5,223	240.8
,, X	17	4,454	210.2
,, AA	25	4,679	202.8
,, AD	18	4,414	180.5
,, V	11	3,947	172.0
,, P	19	4,018	170.0
,, B	30	3,619	167.6
,, AC	18	3,339	152.6
,, O	18	2,727	120.8
,, B*	13	2,545	113.6
,, E	26	1,999	98.6
,, AB	9	1,540	66.3
,, K	4	1,196	54.5
,, L	10	846	37.1

WAROONA B.

Herd.	No. of Cows.	Milk Average.	Butter-fat Average.
		lb.	lb.
Leach, F. C	26	5,810	267.8
Colum, P. J.	36	6,102	262.9
Browning, W.	30	5,139	228.6
Herd T	35	3,995	198.1
,, J*	55	5,016	196.7
,, O	24	4,514	194.0
,, P	32	4,559	190.9
,, W....	47	4,560	190.1
,, K*	35	4,725	187.8
,, P*	48	4,063	165.9
,, U*	28	3,777	161.4
,, L*	18	4,212	159.5
,, M....	134	2,967	130.8
,, T*	36	3,074	129.0

WILGA R.

Herd.	No. of Cows.	Milk Average.	Butter-fat Average.
		lb.	lb.
Chapman, K.	24	5,654	281.3
Charteris, J. S.	25	5,248	229.2
Guy, W.	20	5,149	225.4
Herd C*	30	5,605	212.5
,, T	11	5,515	210.6
,, Z	19	5,524	203.2
,, B	32	4,276	200.2
,, H	23	4,435	195.3
,, D	28	3,933	185.9
,, M	23	5,000	183.8
,, K*	28	4,056	181.6
,, O	19	4,395	181.4
,, L	27	4,505	180.6
,, N	11	4,130	180.0
,, W....	15	4,194	179.7
,, E	12	3,786	166.2
,, U	28	3,711	165.5
,, I	17	3,582	156.0
,, Q	37	3,353	144.2
,, A*	12	3,170	139.6
,, J	24	3,372	117 0
,, F*	17	2,432	113.2
,, D*	23	2,237	97.3

* Inverted.

TUBERCULOSIS

J. Shilkin, Senior Veterinary Surgeon.

Tuberculosis is a disease of considerable importance, both from a public health point of view and for the economic loss to the State occasioned by the destruction of affected carcases of cattle and pigs condemned at slaughter houses.

It is widespread throughout Australia, but since 1938, when energetic steps were commenced to eradicate the disease from the metropolitan dairy herds of Sydney, considerable progress has been made in its eradication in the milk supply herds of all States.

Cause.

The cause is a micro-organism known as Mycobacterium tuberculosis, of which there are three strains, human, bovine, and avian.

The Human Strain affects humans chiefly, but can affect dogs and cats and more rarely, cattle.

The Bovine Strain affects cattle and pigs chiefly, and horses, dogs and cats rarely. Humans, particularly children, are also susceptible to this strain.

The Avian Strain affects poultry and pigs chiefly, humans rarely. Cases of tuberculosis have been recorded in sheep and goats but they are very rare.

Method of Infection.—Whilst the inhalation of the tubercle bacillus is probably the usual route of infection in humans, both inhalation and ingestion with the food are common routes in cattle and pigs. Infected cattle either cough or breathe out the bacilli into feed boxes or onto walls of dairies. Infected saliva may also contaminate feed boxes or the saliva may be swallowed and the tubercle bacilli passed out onto the pastures.

Tubercle bacilli are not particularly resistant to sunlight, and fortunately many would be killed in this manner. At the same time, in protected positions, such as feed boxes or under large clumps of trees, the bacilli can live for quite considerable periods. One would expect, therefore, a more rapid spread through the herd where bail feeding in closed sheds is practised, and in the field this has often been found to occur.

In the case of pigs, milk from tuberculous cows which are passing the bacilli in the milk is often the cause of heavy infection. However, pigs have frequently been heavily infected by grazing over the same pastures as infected cattle. Water can also be a means of spread of the organisms and streams, creeks, etc., flowing from a heavily infected to a neighbouring property may result in infection in cows on that property.

Tuberculosis of the liver of cattle

Susceptibility.—Contrary to a widespread belief, no particular breed of cattle or pigs is more susceptible to the disease. However certain animals in individual herds appear to have a degree of resistance to infection.

Symptoms.

In the majority of cases, cattle or pigs may be affected for years without showing any symptoms. In a small proportion of cases, where the superficial lymphatic glands are involved, swellings may be seen below the ear (parotid lymph gland), under the lower jaw (submaxillary gland), in front of the shoulder (prescapular gland), above the stifle (precrural gland), or above and behind the udder (supramammary gland).

Tuberculosis of the Pluera of a cow ("Grapes")

In cows, where the lungs are affected, a characteristic and persistent cough usually occurs. When the lymphatic glands of the throat are affected, a peculiar snoring noise is often evident, such cows commonly being referred to as "snorers."

Whilst cattle without symptoms or with any of the symptoms described above may live and maintain their condition for years, occasionally, due to some lowering of resistance brought about by poor feeding, drought conditions, strain of calving, or any other factor which may lower resistance, the disease may progress rapidly within the animal's body. Such animals rapidly become emaciated, usually cough, particularly if driven, and may die within a variable period.

Tuberculosis of the lungs of cattle

In pigs, as with cattle, symptoms are not usually seen, but in advanced cases animals may be emaciated, cough frequently, and possibly have diarrhoea.

Post Mortem Appearance.

Cattle.—As cattle may be affected in almost any organ of the body, the post mortem findings will naturally vary considerably depending on the location of the disease.

The lymphatic glands are the organs most generally affected. In the very early stages these glands will be swollen and flabby, but quickly develop small yellow cheesy areas which develop in size and later become calcified (chalky). The lesions then are creamy or white in colour, due to the deposition of lime salts, and when cut have a gritty feel.

Of the other organs the lungs and liver are most frequently affected. In the lungs tuberculous abcesses are scattered throughout the lung tissue, whilst the adjoining bronchial and mediastinal lymphatic glands will also show tuberculous lesions in most cases In some advanced cases masses of tuberculous nodules may cover the pleura (lining of the chest cavity)—the so-called "grapes."

In the infected liver the typical tuberculous abcesses will be seen, varying in number from one or two to large numbers throughout the lung tissue.

Pigs.—As the usual method of infection in pigs is by ingestion, sites usually affected are the lymphatic glands of the throat, head, and intestines. Lesions in pigs do not usually exhibit the characteristic yellow coloured material found in cattle, but are generally paler in colour.

Public Health.

The disease can be transmitted to humans through infected milk. Whilst adults are relatively immune, children up to the ages of about 15 or 16 years are particularly susceptible. Tuberculosis so contracted often results in a crippling condition due to infection of the spine or joints. In very young children bovine tuberculosis of the intestines has been responsible for death.

Fortunately only a small proportion of infected cows pass the tubercle germs in the milk. However, as these germs may be passed intermittently rather than continuously, diagnosis involving examination of the milk may be misleading. In any case, detection of the tubercle germ in the milk requires guinea pig inoculations and a period of 6 to 8 weeks before results can be ascertained. Except for special purposes, therefore, milk examination is of little value in the detection of tuberculosis in cows.

Diagnosis.

Visual diagnosis is only possible in animals showing emaciation, particularly accompanied by a persistent cough, or in those animals exhibiting infections of the superficial lymphatic glands where the swellings are obvious to the naked eye.

Owing to the difficulty in diagnosing the disease in the majority of affected animals, special tests have been devised. The tuberculin test as used at present is a most reliable diagnostic agent, enabling tuberculosis animals, both cattle and pigs, to be detected and eliminated from herds. As these tests, by law, can only be carried out by qualified veterinarians, there is little need to give details of the methods employed, except to mention that the test in general use at present consists of an injection into one tail fold followed by examination of the site of injection in 3 to 4 days

Control.

As there is no treatment which is known to be succesful in curing tuberculosis in stock, control must be based on the ability to locate tuberculous animals, followed by their destruction. For this purpose, the tuberculin test may be used in both cattle and pigs.

In dairy herds, particularly where hand feeding in bails is being practised, removal of tuberculous cattle should be followed by a thorough disinfection of feed boxes, walls, water troughs, etc.

Where cattle and pigs are run together, any attempt at eradication in the pigs must be preceded by testing of the cattle and disposal of re-acting animals.

REVIEW

SHEEPFARMING ANNUAL, 1950, published by Massey Agricultural College, Palmerston North, New Zealand, 220 pages, price 10s. (N.Z.).

Sheepfarming Annual, 1950, just published by Massey Agricultural College (New Zealand), contains much useful information on a wide range of subjects, many of which are of really topical interest to the present-day sheepfarmer. The control of footrot article adds something to present-day knowledge, as do an article on grass-grub control, and an experiment in the dosing of lambs with phenothiazine at varying strengths and intervals. A discussion on farm tractors and attachments will probably be widely read in this age of farm mechanisation; while high prices for commodities make "Timber Preservation on the Farm" and "Preservation and Care of Farm Skins" well worth study.

In the more general farming sphere, there is a talk on wool marketing plans by the chairman of the New Zealand Wool Board (Mr. N. R. Jameson), and observations on farming in Great Britain by the Principal of Massey College (Professor G. S Peren) and the Director of the Grasslands Divisions, Department of Scientific and Industrial Research (Mr. E. B. Levy). Discussions following all papers are illuminating.

The Official Australian Pure Breeds Recording Scheme

ANNUAL REPORT, 1950-1951

H. G. ELLIOTT, Assistant Superintendent of Dairying.

B. H. DRAKES, Assistant Dairy Records.

As the testing year now closes on 30th April, the season under review covers the 10 months from the 1st July, 1950, to 30th April, 1951. Consequently the number of cows included is fewer than in the previous year.

Thirty-nine herds were under test and 657 cows. Owing to sickness and other causes 72 cows did not complete 150 days under test and are not included in any of the averages.

The remaining 585 cows averaged 6,231 lb. of milk 4.40% test and 274.20 lb. of butterfat or slightly lower than the previous year. Table 1 shows the average production of cows completing test for several years.

Table 1.

AVERAGE PRODUCTION—PURE BRED HERDS.

Year.	No. of Cows Completing Test.	Average Butterfat per Cow.
1934–35	305	320·26
1938–39	375	292·40
1940–41	372	298·38
1942–43	294	321·27
1944–45	344	289·42
1947–48	607	297·24
1948–49	598	288·98
1949–50	717	276·84
1950–51	585	274·20

It is disappointing to note that the decline in the average production referred to in last year's report has continued, but during the year two or three herds ceased testing at a time when several of the cows had not completed their lactations, and as they had been under test 150 days or more their productions are included in the averages.

Table 2 shows the percentage of cows passing standard for some years and again shows the low percentage of Pure Bred cows under test passing standard. It will be seen that 58% of Guernseys and 52% of Friesians passed standard while the percentage of Jerseys and Australian Illawarra Shorthorn was much lower.

TABLE 2.

PERCENTAGE OF COWS PASSING STANDARD.

Year.	Australian Illawarra Shorthorn.	Guernsey.	Jersey.	Friesian.	Total.
1937–38	59·1	68·7	35·6	....	53·1
1939–40	48·0	77·5	64·2	....	59·2
1944–45	52·5	43·4	72·2	....	57·3
1945–46	43·1	33·3	52·9	....	43·8
1947–48	44·4	54·4	63·2	....	54·0
1948–49	35·7	52·1	57·4	....	48·5
1949–50	25·5	55·7	44·2	....	37·5
1950–51	23·9	58·0	38·8	52·1	37·7

Table 3 gives the number of cows passing standard in each age group. Once again this table shows that the junior cows did better than the seniors, 53% of the junior two-year-olds passing standard, compared with 27% of the mature cows.

TABLE 3.

COWS PASSING STANDARD 1950–51.

Age Class.	Standard.	A.I.S.		Guernsey.		Jersey.		Friesian.		All Breeds.	
		Cows Tested	Passed Standard	Cows Tested	Passed Standard	Cows Tested	Passed Standard.	Cows Tested	Passed Standard.	Cows Tested	Passed Standard.
Mature	350	58	5	32	14	77	20	24	13	191	52
Senior 4 years	330	26	4	5	3	19	12	5	3	55	22
Junior 4 years	310	15	2	8	7	14	6	....	....	37	15
Senior 3 years	290	26	7	13	8	15	3	2	....	56	18
Junior 3 years	270	20	4	7	4	23	12	4	....	54	20
Senior 2 years	250	17	5	17	8	16	6	2	....	52	19
Junior 2 years	230	51	24	18	14	60	28	11	9	140	75
Total	....	213	51	100	58	224	87	48	25	585	221
Percentages	....	....	23·9	....	58·0	....	38·8	....	52·1	....	37·7

The average production of milk and butterfat in each age group of each breed is given in Table 4. For all breeds the only age group to exceed standard was the junior two-year-olds. The mature cows failed to reach standard production in any breed.

It is worthy of note that in the Guernsey Breed all age groups except the mature cows, exceeded standard. Friesians came under Official Test for the first time and only 48 Cows completed test. As a breed the Guernseys had a higher butterfat average, but the average milk of the Friesians was well above that of other breeds.

TABLE 4.

AVERAGE PRODUCTION IN EACH AGE CLASS, 1950–51.

Age Class.	Standard.	A.I.S.				Guernsey.				Jersey.				Friesian.				All Breeds.			
		No. of Cows.	Milk.	Per cent.	Butter-fat.	No. of Cows.	Milk.	Per cent.	Butter-fat.	No. of Cows.	Milk.	Per cent.	Butter-fat.	No. of Cows.	Milk.	Per cent.	Butter-fat.	No. of Cows.	Milk.	Per cent.	Butter-fat.
			lb.		lb.		lb.		lb.		lb.		lb.		lb.		lb.		lb.		lb.
Mature	350	58	7,600	3·63	275·99	32	6,116·8	5·24	320·68	77	5,877·4	4·99	293·47	24	9,360	3·64	341·14	191	6,924	4·31	298·66
Senior 4 yrs.	330	26	7,417	3·75	278·37	5	7,317·2	5·43	397·46	19	6,715·5	5·19	349·07	5	10,811	3·16	342·64	55	7,474	4·27	319·46
Junior 4 yrs.	310	15	5,747	3·89	224·02	8	7,276·8	5·09	370·99	14	6,020·1	5·01	301·76	....	....	....	....	37	6,183	4·61	285·21
Senior 3 yrs.	290	26	6,839	3·80	260·09	13	6,931·1	4·79	332·16	15	4,664·5	4·80	223·90	2	4,755	3·71	176·79	56	6,132	4·30	264·15
Junior 3 yrs.	270	20	5,866	3·90	229·15	7	6,234·2	5·17	322·47	23	5,111·7	5·45	278·71	4	6,317	3·58	226·39	54	5,626	4·65	262·15
Senior 2 yrs.	250	17	6,068	3·92	238·05	17	5,089·3	5·14	261·63	16	4,367·7	5·04	220·29	2	7,489	3·10	232·49	52	6,149	4·54	240·08
Junior 2 yrs.	230	51	5,975	3·88	232·43	18	5,630·8	5·00	281·90	60	4,568·6	5·09	232·79	11	7,433	3·66	273·75	140	5,445	4·44	242·19
Total	....	213	6,680	3·78	252·82	100	6,163·0	5·07	313·04	224	5,338·0	5·07	271·05	48	8,554	3·56	304·92	585	6,231	4·40	274·20

TABLE 5.

COMPARATIVE TABLE SHOWING AVERAGE PRODUCTION IN EACH AGE CLASS OF COWS UNDER TEST 150 DAYS OR OVER AND COWS COMPLETING 273 DAYS.

Age Class.	Standard.	A.I.S.				Guernsey.				Jersey.				Friesian.				All Breeds.			
		No. tested 150 days or over.	Average Butter-fat.	No. tested 273 days.	Average Butter-fat.	No. tested 150 days or over.	Average Butter-fat.	No. tested 273 days.	Average Butter-fat.	No. tested 150 days or over.	Average Butter-fat.	No. tested 273 days.	Average Butter-fat.	No. tested 150 days or over.	Average Butter-fat.	No. tested 273 days.	Average Butter-fat.	No. tested 150 days or over.	Average Butter-fat.	No. tested 273 days.	Average Butter-fat.
			lb.		lb.		lb.		lb.		lb.		lb.		lb.		lb.		lb.		lb.
Mature	350	58	275·99	43	293·84	32	320·37	25	364·80	77	293·47	48	344·08	24	341·14	14	353·99	191	298·66	130	332·53
Senior 4 yrs.	330	26	278·32	21	295·77	5	397·46	3	517·93	19	349·06	12	367·37	5	243·64	4	333·16	55	319·46	40	340·14
Junior 4 yrs.	310	15	224·02	6	261·22	8	370·99	7	374·39	14	301·75	8	350·65	....	....	....	....	37	285·21	31	333·01
Senior 3 yrs.	290	26	260·09	19	275·56	13	332·16	12	348·25	15	223·90	7	250·14	2	176·79	....	....	56	264·15	38	293·83
Junior 3 yrs.	270	20	229·15	12	260·13	7	322·47	6	344·45	23	278·71	15	334·58	4	226·39	1	205·69	54	262·15	34	306·25
Senior 2 yrs.	250	17	238·05	11	269·87	17	261·63	13	302·26	16	220·29	8	261·82	2	232·49	1	235·78	52	240·08	33	279·64
Junior 2 yrs.	230	51	232·43	43	246·44	18	281·90	13	327·12	60	232·78	32	268·90	11	273·75	8	281·60	140	242·19	96	267·78
Total	....	213	252·82	155	273·14	100	313·04	79	350·93	224	271·05	130	317·68	48	304·92	28	320·81	585	274·20	392	294·24

Table 5 gives a comparison between those cows which were under test 150 days or over and those completing 273 days. This table shows that in the 273 days' average for all herds the only age group which did not exceed standard was the mature, and the Guernsey Breed was the only one in which all age classes exceeded standard. The proportion of cows completing 273 days is approximately the same as last year.

A comparison of breeds in shown in Table 5 (a).

TABLE 5A.

A COMPARISON OF THE BREEDS IS AS FOLLOWS;—

	150 Days and Over.			273 Days			273 Days.
	Cows.	Milk.	Fat.	Cows.	Milk.	Fat.	Percentage of Total.
		lb.	lb.		lb.	lb.	
A.I.S.	213	6,680	252·82	155	7,268	273·14	72
Guernsey	100	6,163	313·04	79	6,908	350·93	79
Jersey	224	5,338	271·05	130	6,159	317·68	58
Friesian	48	8,554	304·92	28	9,307	320·81	58
Total	585	6,231	274·20	392	6,973	294·24	67·0

The leading sire for the year was Koojan Ace's Warspite owned by the Muresk Agricultural College. His 18 daughters averaged 412.73 lb. of butterfat, next was Koojan Ace's Adjutant (Muresk Agricultural College) with six daughters averaging 360.75 lb. butterfat, followed by Eungella Golden Starbright (T. O. Abbott) whose six daughters averaged 338.23 lb. butterfat.

TABLE 6.

LEADING THREE SIRES.

Name of Bull.	Owner.	Sire.	Dam.	Number of Daughters Tested.	Average Production (without Allowances) Butterfat.
					lb.
Koojan Ace's Warspite (5943) Guernsey	Muresk Agricultural College.	Homestead Ace (Imp. U.S.A.) (1631)	Koojan Ideal's Jewel (7257)	18	412·73
Koojan Ace's Adjutant (9,665) Guernsey	Muresk Agricultural College.	Homestead Ace (Imp. U.S.A.) (1631)	Koojan Ideal's Jewel (7257)	6	360·75
Eungella Golden Starbright (20666) Jersey	T. O. Abbott "Silverdale" Coolup, W.A.	Travalgan Starbrights' King (18,129)	Greenmount Golden Gem (76619)	6	338·23

The productions of the three leading cows in each age group are shown in Table 7. Three cows gave over 600 lb. of butterfat, six over 500 lb. and 11 over 400 lb.

Of the 21 cows shown, five are Jerseys, nine Guernseys and seven Australian Illawarra Shorthorn.

TABLE 7.

THREE LEADING COWS IN EACH AGE CLASS.

Name of Cow.	Breed.	Weight of Milk for Period.	Average Test %	Weight of Butterfat for Period.	Owner.
		Mature.			
Kapara Iolanthe	Jersey	12,492	5·07	633·73	D. Bradford.
Valliere Dairymaid	A.I.S.	14,178	4·05	574·53	J. H. Bensted & Co.
Muresk Dora	Guernsey	12,324	4·27	526·61	Muresk Agricultural College.
		Senior 4 Years Old.			
Tabbagong Beauty 54th	A.I.S.	14,254	4·42	629·64	W. H. Montgomery.
Narrogin Collette	A.I.S.	11,820	4·74	560·85	Narrogin School of Agriculture.
Denmark Golden Veronica	Guernsey	9,802	5·61	549·72	Denmark Research Station.
		Junior 4 Years Old.			
Muresk Morning Glory 2nd	Guernsey	9,108	5·15	469·56	Muresk Agricultural College.
Eungella Miss Marinora 2nd	Jersey	8,529	5·26	448·90	D. G. Spark.
The Wold Princess Daisy 6th	Jersey	7,828	5·71	447·08	Field Bros.
		Senior 3 Years Old.			
Muresk Air Hostess	Guernsey	11,696	5·26	616·12	Muresk Agricultural College.
Southlyn Pearl	A.I.S.	11,523	4·24	488·88	J. H. Bensted & Co.
Muresk Delicia 2nd	Guernsey	9,456	4·78	451·72	Muresk Agricultural College.
		Junior 3 Years Old.			
Denmark Warspite's Jean	Guernsey	10,027	5·21	522·91	Denmark Research Station.
Kapara Rosemarie 2nd	Jersey	6,647	6·35	428·77	D. Bradford.
Trelawney Sadie	Jersey	7,297	5·50	400·22	J. C. Bushell.
		Senior 2 Years Old.			
Chelsea Julie	Guernsey	8,235	4·87	401·39	W. D. Patmore.
Denmark Warspite's Rose	Guernsey	7,872	5·08	400·10	Denmark Research Station.
Southlyn Rose	A.I.S.	9,349	4·17	389·92	J. H. Bensted & Co.
		Junior 2 Years Old.			
Montaro Fairy 4th	A.I.S.	12,059	4·48	540·98	W. H. Montgomery.
Wooroloo Helen	A.I.S.	10,125	4·02	407·52	Wooroloo Sanatorium Farm.
Muresk Edith	Guernsey	8,244	4·88	402·42	Muresk Agricultural College.

New Records.

Five new records were established during the year. The Australian Illawarra Shorthorn cow Montaro Fairy 4th, owned by Mr. M. H. Montgomery, of Armadale, became the holder of three records, as

follows:—In producing 12,059 lb. of milk, averaging 4.48% and 540.98 lb. of butterfat, she exceeded the previous record in the A.I.S. Junior two-year-old class held by Valliere Nina (C. P. House) with 460.64 lb. of butterfat. Also the junior two-year-old records for all breeds and Western Australian bred, which were previously held by Carydale Royal Princess (G. Layman) with 522.98 lb. of butterfat.

Montaro Fairy 4th is by River Glen Marksman, champion at Perth Royal Show in 1948 and 1950.

Her dam is Glanavon Fairy 6th, who produced 369 lb. of butterfat as a senior four-year-old.

A.I.S. Senior Four-year-old.

Tabbagong Beauty 54th, also owned by Mr. M. H. Montgomery, produced 14,254 lb. of milk, average test 4.42% and 629.64 lb. of butterfat, exceeding the previous record in this class which since 1930 was held by Hope 3rd of The Hill, owned by W. G. Burges, her figure being 13,423 lb. milk, average test 4.44% and 606.0 lb. of butterfat.

Tabbagong Beauty 54th was imported from South Australia by Mr. Montgomery.

Guernsey (Junior Three-year-old).

The new record holder in this class is Denmark Warspite's Jean, whose production was 10,027 lb. of milk, average test 5.21% and 522.91 lb. of butterfat. This record was previously held by another cow from the Denmark Research Station, viz., Denmark Jonquil, with 8,812 lb. of milk, average test 5.72% and 504.22 lb. of butterfat.

Denmark Warspite's Jean is by Koojan Ace's Warspite, whose dam, Kojan Ideal's Jewel, produced 12,397 lb. of milk, average test 5.30% and 657.65 lb. of butterfat as a senior two-year-old. Her dam was Denmark Dame 2nd, who produced 410.26 lb. of butterfat as a mature cow.

The production of all cows which completed test during the period under review are again given under their respective breeds and owners. The number of cows included in the average and the average milk and butterfat are given for each herd.

PURE BRED HERD TESTING.

COWS WHICH COMPLETED TEST DURING THE SEASON ENDED 30th APRIL, 1951

GUERNSEYS.

Name of Cow.	Age Class.	Date of Entry to Test.	No. of Days in Test.	Weight of Milk on Last Day of Test.	Weight of Milk for Period.	Average Test.	Weight of Butterfat for Period.	Sire.
				lb.	lb.	%	lb.	
MURESK AGRICULTURAL COLLEGE.								
Muresk Dora	Mature	9–5–50	273	33	12,324	4·27	526·61	Koojan Ace's Warspite (4943)
Muresk Helianthus	Mature	9–4–50	273	24·5	10,273	4·86	499·52	Koojan Ace's Warspite (5943)
Muresk Jessica	Mature	8–3–50	273	21	8,733	4·58	409·44	Koojan Ideal's Dictator (4167)
Muresk Diadem	Mature	29–4–50	273	18	7,719	5·20	401·98	Koojan Ace's Warspite (5943)
Muresk Anna	Mature	21–5–50	273	11·5	8,809	4·44	390·92	Koojan Ideal's Dictator (4167)
Muresk Dignity	Mature	2–3–50	273	17	7,476	4·40	329·22	Koojan Ideal's Dictator (4167)
Muresk Lady Ideal	Mature	12 7–50	30	49	1,470	4·88	71·82	Koojan Ideal's Dictator (4167)
Muresk Morning Glory 2nd	Junior 4 years	26–6–50	273	21	9,108	5·15	469·56	Koojan Ace's Warspite (5943)
Muresk Fay	Junior 4 years	29–10–49	240	14	7,140	4·86	347·22	Koojan Ace's Warspite (5943)
Muresk Air Hostess	Senior 3 years	6–8–50	273	42	11,696	5·26	616·12	Koojan Ace's Warspite (5943)
Muresk Delicia 2nd	Senior 3 years	9–6–50	273	22	9,456	4·78	451·72	Koojan Ace's Warspite (5943)
Muresk Jewel 2nd	Senior 3 years	22–6–50	273	22·5	8,122	4·75	385·77	Koojan Ace's Warspite (5943)
Muresk Diamond Lass 2nd	Junior 3 years	30–10–49	273	21	7,293	5·34	389·41	Koojan Ace's Warspite (5943)
Muresk Dorothy	Junior 3 years	26–5–50	273	21·5	7,594	5·04	382·47	Koojan Ace's Warspite (5943)
Muresk Edith	Junior 2 years	28–6–50	273	23	8,244	4·88	402·42	Koojan Ace's Adjutant (7431)
Muresk Fay's Margot	Junior 2 years	19–5–50	273	29·5	8,338	4·73	394·27	Koojan Ace's Adjutant (7431)
Muresk Dimple	Junior 2 years	2–6–50	273	21·5	6,619	5·28	349·54	Koojan Ace's Adjutant (7431)
Muresk Boniface's Hope	Junior 2 years	6–8–50	273	16	5,658	6·07	343·89	Koojan Ace's Adjutant (7431)
Muresk Barbara	Junior 2 years	29–4–50	273	22	7,146	4·75	339·67	Koojan Ace's Adjutant (7431)
Muresk Merilyn	Junior 2 years	17–5–50	273	18·5	6,955	4·81	334·71	Koojan Ace's Adjutant (7431)

Number of Cows in Average, 19. Average Milk, 8,353 lb. Average Test, 5·07 per cent. Average Butterfat, 423·92 lb.

A. W. PADBURY.								
Koojan Noblemark's Bo-Peep	Mature	15–11–49	273	15	9,585	5·39	516·58	Koojan Ideal's Noblemark (5949)
Koojan Ace's Diplomat	Mature	2–10–49	273	17	8,091	5·58	451·94	Homestead Ace (Imp.) (1631)
Koojan Ace's Julianna	Mature	22–9–49	273	17	8,481	5·15	436·94	Homestead Ace (Imp.) (1631)
Denmark Ace's Dame	Mature	2–1–50	273	14·5	7,078	5·73	406·12	Homestead Ace (Imp.) (1631)
Denmark Ace's Dawn 2nd	Mature	2–1–50	273	16·5	6,229	5·95	370·86	Homestead Ace (Imp.) (1631)
Denmark Ace's Velda	Mature	3–7–50	30	28	840	4·29	36·09	Homestead Ace (Imp.) (1631)
Koojan Ace's Jennie	Senior 4 years	24–10–49	273	19	8,187	5·60	458·78	Homestead Ace (Imp.) (1631)
Koojan Whirlwind's Trixie	Senior 4 years	24–3–50	150	30·5	5,145	5·12	263·36	Koojan Ace's Whirlwind (7447)
Westham Rosette	Senior 4 years	11–6–50	60	35	2,100	4·25	89·22	Koojan Ideal's Reflection (4974)

Number of Cows in Average, 7. Average Milk, 7,542 lb. Average Test, 5·52 per cent. Average Butterfat, 414·94 lb.

PURE BRED HERD TESTING—continued.

COWS WHICH COMPLETED TEST DURING THE SEASON ENDED 30TH APRIL, 1951—*continued.*

GUERNSEYS.

Name of Cow.	Age Class.	Date of Entry to Test.	No. of Days in Test.	Weight of Milk on Last Day of Test. lb.	Weight of Milk for Period. lb.	Average Test. %	Weight of Butterfat for Period. lb.	Sire.
W. D. PATMORE.								
Denmark Reflection's Dawn	Mature	10–7–50	273	13·5	8,545	5·02	428·62	Koojan Ideal's Reflection (4974)
Brookfield's Blanche	Mature	12–9–50	60	25	1,890	4·33	81·84	Yarraview Julian (4634)
Chelsea Beauty	Senior 4 years	4–5–50	273	24	10,632	5·13	545·30	Denmark Briar's Reflection (5745)
Chelsea Rosita	Senior 3 years	29–3–50	273	17	7,101	5·43	385·50	Denmark Briar's Reflection (5745)
Chelsea Velvet	Senior 3 years	8–4–50	273	15	7,665	4·87	373·68	Denmark Briar's Reflection (5745)
Chelsea Julie	Senior 2 years	2–4–50	273	25	8,235	4·87	401·39	Denmark Briar's Reflection (5745)
Chelsea Pearl	Senior 2 years	10–6–50	273	11	6,858	5·48	375·57	Chelsea Mahomed (6970)
Chelsea Dawn	Junior 2 years	27–7–50	273	15	6,945	5·14	356·64	Denmark Briar's Reflection (5745)
Chelsea Dulcie	Junior 2 years	13–7–50	273	13	6,249	5·10	319·18	Denmark Briar's Reflection (5745)
Number of Cows in Average, 8. Average Milk, 7,778 lb. Average Test, 4·94 per cent. Average Butterfat, 385·73 lb.								
DENMARK RESEARCH STATION.								
Denmark Ace's Dawn 3rd	Mature	13–7–50	273	18·5	9,160	5·06	463·30	Denmark Ace (5738)
Denmark Valencia's Image	Mature	21–4–50	273	20	7,515	5·02	377·28	Koojan Ideal's Reflection (4974)
Denmark Dame 2nd	Mature	14–6–50	273	14·5	7,468	4·51	337·26	Denmark Lady's Goldseeker (4799)
Denmark Bonnie Mary	Mature	25–4–50	273	16	4,413	5·23	230·74	Denmark Illustrious (3320)
Denmark Golden Veronica	Senior 4 years	12–7–50	273	17·5	9,802	5·61	549·72	Denmark Ace (5738)
Denmark Reflection's Velvet	Senior 4 years	26–5–50	90	19	2,160	5·42	117·15	Koojan Ideal's Reflection (4974)
Denmark Ace's Valencia	Junior 4 years	4–7–50	273	15·5	8,011	4·99	400·15	Denmark Ace (5738)
Denmark Reflection's Marion	Junior 4 years	5–7–50	273	18·5	7,060	5·33	376·59	Koojan Ideal's Reflection (4974)
Denmark Aristocrat's Reflectionette	Junior 4 years	1–7–50	60	25·5	1,755	3·81	66·93	Denmark Ace's Aristocrat (5740)
Denmark Ace's Countess	Senior 3 years	13–1–50	273	20	6,060	5·56	336·92	Denmark Ace (5738)
Denmark Reflection's Angel	Senior 3 years	27–7–50	273	4	4,692	8·15	341·75	Koojan Ideal's Reflection (4974)
Denmark Warspite's Jean	Junior 3 years	17–7–50	273	22·5	10,027	5·21	522·91	Koojan Ace's Warspite (5943)
Denmark Aristocrat's Diane	Junior 3 years	25–1–50	273	18	5,544	5·35	296·78	Denmark Ace's Aristocrat (5740)
Denmark Reflectionette 2nd	Junior 3 years	25–2–50	273	9	4,227	5·32	224·89	Denmark Ace (5738)
Denmark Ace's Light	Junior 3 years	6–2–50	210	9	3,255	5·85	190·62	Denmark Ace (5738)
Denmark Warspite's Rose	Senior 2 years	6–5–50	273	24	7,872	5·08	400·10	Koojan Ace's Warspite (5943)
Denmark Wave	Senior 2 years	28–3–50	273	27	6,981	5·36	374·42	Koojan Ace's Warspite (5943)
Denmark Warita	Senior 2 years	12–3–50	273	25·5	7,006	5·26	368·34	Koojan Ace's Warspite (5943)
Denmark Warette	Senior 2 years	4–5–50	273	19·5	7,033	4·98	350·11	Koojan Ace's Warspite (5943)
Denmark Perfection	Senior 2 years	22–5–50	273	16	7,368	4·29	316·42	Koojan Ace's Warspite (5943)
Denmark Maria	Senior 2 years	4–3–50	273	22	5,331	5·31	283·29	Koojan Ideal's Reflection (4974)
Denmark Aristocrat's Daylight	Senior 2 years	15–2–50	273	14	4,182	5·09	213·26	Denmark Ace's Aristocrat (5740)
Denmark Bonnie Marie 2nd	Senior 2 years	27–3–50	150	21	3,300	4·76	157·05	Denmark Jonquil's Ace (7045)
Denmark Warspite's Marie	Junior 2 years	8–8–50	273	18	6,114	5·46	334·15	Koojan Ace's Warspite (5943)
Denmark Warspite's Pekoe	Junior 2 years	21–2–50	273	22	6,411	4·56	292·47	Koojan Ace's Warspite (5943)
Number of Cows in Average, 23. Average Milk, 6,471 lb. Average Test, 5·13 per cent. Average Butterfat, 332·11 lb.								

G. BRENTON.

Rutherwood Rosebud 2nd	Mature	17–3–51	30	21·5	645	4·74	30·57	Koojan Ace's Sunshade (5942)
Rutherwood Golden Dawn 2nd	Junior 4 years	12–6–50	273	10·5	8,236	4·64	382·27	Koojan Ace's Sunshade (5942)
Rutherwood Daisy 2nd	Junior 4 years	17–8–50	273	8·0	6,819	4·95	338·08	Koojan Ace's Sunshade (5942)
Rutherwood Rosebud 2nd	Junior 4 years	19–4–50	273	10·5	5,731	5·09	291·55	Koojan Ace's Sunshade (5942)
Rutherwood Maid Marion 2nd	Senior 3 years	13–4–50	273	19	6,852	4·09	280·37	Koojan Ace's Sunshade (5942)
Rutherford Dinah 2nd	Junior 3 years	4–7–50	273	5	5,700	4·59	261·87	Koojan Ace's Sunshade (5942)
Rannock Rosalyn	Junior 2 years	6–7–50	273	6·5	6,574	4·73	311·14	Denmark Prosamic (4010)
Rannock Dulcie	Junior 2 years	17–7–50	240	6·0	5,595	4·32	241·83	Denmark Prosamic (4010)
Rutherwood Dame 2nd	Junior 2 years	13–9–49	273	14·5	5,113	4·71	240·97	Koojan Ace's Sunshade (5942)

Number of Cows in Average, 8. Average Milk, 6,328 lb. Average Test, 4·63 per cent. Average Butterfat, 293·51 lb.

W. J. SMITH.

Marrivale Anne	Mature	3–5–50	273	23·5	8,025	5·56	446·61	Denmark Ace's Image (5741)
Marrivale Sublime	Mature	15–5–50	273	18	6,654	4·47	297·27	Moongi Golden Dream (1493)
Marrivale Serene	Mature	7–4–50	273	15	5,655	4·81	271·93	Marrivale Buccaneer (5041)
Marrivale Sylph	Mature	13–4–50	273	17	4,461	5·56	248·20	Koojan Golden Prosper (2283)
Marrivale Vera	Junior 4 years	3–5–50	273	18·5	6,310	5·74	362·53	Denmark Ace's Image (5741)
Marrivale Placid	Senior 3 years	16–7–50	273	14·5	6,988	4·66	325·37	Denmark Ace's Image (5741)
Marrivale Annette	Senior 3 years	9–4–50	273	19	5,457	5·72	312·21	Denmark Ace's Image (5741)
Marrivale Pandorah	Junior 2 years	14 5–50	273	11	4,173	5·60	233·69	Denmark Dame's Reflection (7031)
Marrivale Reflection's Dame	Junior 2 years	30–4–50	240	6	2,280	5·67	129·12	Denmark Dame's Reflection (7031)
Marrivale Salome	Junior 2 years	31–3–50	90	13	1,110	5·14	57·12	Denmark Dame's Reflection (7031)

Number of Cows in Average, 9. Average Milk, 5,556 lb. Average Test, 5·25 per cent. Average Butterfat, 291·88 lb.

J. CABASSI.

Clovelly Melba	Mature	18–8–50	240	5	6,210	4·58	284·80	Lansdowne Polydymite (4995)
Clovelly Cherry	Mature	3–5–50	273	17	5,646	4·93	278·50	Koojan Monogram (4174)
Clovelly Golden Peach	Mature	31–7–50	273	4·5	5,488	4·98	273·40	Lansdowne Polydymite (4995)
Clovelly Crystal	Mature	3–5–50	273	13	5,139	5·14	264·05	Koojan Monogram (4174)
Clovelly Blossom 2nd	Mature	29–6–50	273	3	4,149	5·81	241·20	Denmark Rosa's Ace (5760)
Clovelly Lily	Mature	5–5–50	273	15·5	4,396	5·07	223·09	Lansdowne Polydymite (4995)
Clovelly Dainty	Mature	19–9–50	150	5·5	3,430	4·44	152·40	Koojan Monogram (4174)
Clovelly Diana	Mature	15–8–50	210	4·5	2,785	4·88	136·08	Lansdowne Polydymite (4995)
Clovelly Lola	Mature	24–5–50	150	16	2,490	4·90	122·19	Lansdowne Polydymite (4995)
Clovelly Hazel	Mature	29–5–50	210	6	2,400	4·54	108·99	Lansdowne Polydymite (4995)
Clovelly Primrose	Mature	19–8–50	120	9·5	1,485	4·69	69·78	Koojan Monogram (4174)
Clovelly Verna	Senior 3 years	20–5–50	273	9·5	4,363	5·49	239·40	Denmark Rosa's Ace (5760)
Clovelly Windsor Stella	Senior 3 years	5–5–50	273	6	4,638	4·96	230·15	Pleasant Bank's Windsor (7820)
Clovelly Bluebell 2nd	Senior 3 years	27–6–50	90	12·5	1,350	4·33	58·47	Pleasant Bank's Windsor (7820)
Clovelly Pansy 2nd	Senior 3 years	21–5–50	120	2·5	1,020	4·67	47·70	Denmark Rosa's Ace (5760)
Clovelly Fairy	Senior 2 years	5–6–50	273	6·5	4,879	6·19	302·01	Pleasant Bank's Windsor (7820)
Clovelly Daphne	Senior 2 years	4–5–50	273	11	3,918	5·31	208·00	Pleasant Bank's Windsor (7820)
Clovelly Wavelet 2nd	Senior 2 years	22–5–50	273	5·5	3,766	5·08	191·45	Pleasant Bank's Windsor (7820)
Clovelly Lassie	Seniot 2 yea s	15–5–50	273	3·5	2,890	5·02	145·09	Pleasant Bank's Windsor (7820)
Clovelly Daisy Bella	Junior 2 years	21–7–50	240	4	4,425	5·00	221·52	Pleasant Bank's Windsor (7820)

Number of Cows in Average, 17. Average Milk, 4,177 lb. Average Test, 5·10 per cent. Average Butterfat, 213·07 lb.

PURE BRED HERD TESTING—continued.

COWS WHICH COMPLETED TEST DURING THE SEASON ENDED 30TH APRIL, 1951—*continued.*

GUERNSEYS.

Name of Cow.	Age Class.	Date of Entry to Test.	No. of Days in Test.	Weight of Milk on Last Day of Test. lb.	Weight of Milk for Period. lb.	Average Test. %	Weight of Butterfat for Period. lb.	Sire.
A. S. FERRY.								
Woodford Dainty	Mature	7–4–50	210	10	3,750	6·25	234·48	Yarraview Clarinet 2nd (4629)
Woodford Julie's Primrose	Mature	16–4–50	180	4·5	2,160	5·23	91·38	Yarraview Julian (4634)
Woodford Chosen	Senior 4 years	7–7–50	150	6	2,820	6·03	170·16	Brookfield's Belief (6820)
Woodford Heather	Senior 3 years	29–6–50	150	9	3,015	4·62	139·21	Brookfield's Belief (6820)
Woodford Twinkle	Senior 3 years	23–7–50	120	18	2,895	4·42	127·89	Brookfield's Belief (6820)
Woodford Marie	Senior 2 years	29–4–50	210	10	2,895	5·15	149·04	Brookfield's Belief (6820)
Woodford Rosette	Senior 2 years	10–4–50	210	5·5	2,355	4·77	112·38	Brookfield's Belief (6820)
Woodford Jingle	Senior 2 years	30–6–50	150	3·5	1,650	6·05	99·90	Brookfield's Belief (6820)
Woodford Julie's Cowslip	Junior 2 years	9–6–50	180	10	2,880	4·84	139·37	Brookfield's Belief (6820)
Woodford Star	Junior 2 years	6–7–50	150	5·5	1,635	5·49	89·80	Brookfield's Belief (6820)
Woodford Carol	Junior 2 years	17–10–50	30	22·5	675	4·41	29·79	Brookfield's Belief (6820)

Number of Cows in Average, 9. Average Milk, 2,573 lb. Average Test, 5·29 per cent. Average Butterfat, 136·19 lb.

JERSEYS.

D. BRADFORD.								
Kapara Iolanthe	Mature	18–5–50	273	34	12,492	5·07	633·73	Congelin Jolly Eminent 3rd (18425)
Kapara Sweet Briar	Mature	2–9–50	273	27·5	7,897	4·34	342·72	Congelin Mandarin (14542)
Kapara Happy Days 4th	Junior 4 years	25–5–50	273	18	7,944	5·07	403·13	Congelin Mandarin (14542)
Kapara Sweet Briar 2nd	Junior 4 years	26–9–50	90	40·5	4,065	3·78	153·69	Congelin Washington (18426)
Kapara Rose Marie 2nd	Junior 3 years	30–4–50	273	14	6,747	6·35	428·77	Grass Vale Twylish Lad (21816)
Kapara Rose Marie 3rd	Junior 2 years	27–8–50	273	9	4,857	5·22	253·59	Windrest Noble Knight (3649)
Kapara Lassie's Charm	Junior 2 years	6–5–50	273	14	4,917	5·09	250·48	Windrest Noble Knight (3649)
Kapara Daphne 2nd	Junior 2 years	6–7–50	60	28	1,890	5·19	98·10	Windrest Noble Knight (3649)

Number of Cows in Average, 6. Average Milk, 7,475 lb. Average Test, 5·15 per cent. Average Butterfat, 385·40 lb.

J. C. BUSHELL.								
Juadine Peggy	Mature	30–4–50	273	18·5	8,830	4·26	376·30	Austral Park Wonderful Standard (12423)
Trelawney Lighty	Senior 4 years	7–5–50	273	29	10,032	5·34	536·01	Greenmount Golden Patch (19603)
Trelawney Sadie	Junior 3 years	26–4–50	273	21·5	7,279	5·50	400·22	Juadine Commander (1397)
Trelawney Golden Ray	Junior 3 years	15–3–50	273	18	6,744	5·68	383·02	Juadine Commander (1397)
Trelawney Ginger Bread 2nd	Junior 2 years	20–6–50	210	21	4,500	5·09	229·05	Juadine Commander (1397)

Number of Cows in Average, 5. Average Milk, 7,477 lb. Average Test, 5·14 per cent. Average Butterfat, 384·92 lb.

R. H. ROSE & SON.

Grass Vale Buttercup 17th	Mature	9–6–50	273	20	9,510	5·46	519·52	Mornmoot Northwood Beau (17798)
Grass Vale Northwood Eve	Mature	30–4–50	273	13·5	9,265	5·24	485·78	Mornmoot Northwood Beau (17798)
Grass Vale Silvermine 4th	Mature	1–5–50	273	14·5	8,203	5·77	473·96	Mornmoot Northwood Beau (17798)
Grass Vale Lady Fowler 39th	Mature	10–7–50	273	12	9,165	4·82	441·84	Mornmoot Northwood Beau (17798)
Grass Vale Lady Fowler 46th	Mature	6–8–50	273	11·5	6,159	5·87	361·74	Glen Iris Golden Oxford (12694)
Grass Vale Silvermine 3rd	Mature	8–7–50	273	7	6,231	5·26	327·87	Mornmoot Northwood Beau (17798)
Grass Vale Golden Cream 21st	Mature	19–7–50	273	11·5	6,319	5·02	317·04	Grass Vale Gold Boy (14684)
Grass Vale Golden Cream 26th	Mature	26–4–50	210	10·5	4,710	6·58	310·02	Mornmoot Northwood Beau (17798)
Grass Vale Lady Fowler 32nd	Mature	7–6–50	210	20	5,820	4·49	261·75	Mornmoot Northwood Beau (17798)
Grass Vale Magnolia 5th	Mature	10–6–50	210	13	5,280	4·66	246·33	Grass Vale Gold Cup (20745)
Grass Vale Design's Magnolia	Mature	29–5–50	210	10·5	4,170	5·31	221·67	Mornmoot Northwood Beau (17798)
Grass Vale Magnolia 4th	Mature	9–8–50	150	20·5	4,515	4·91	221·67	Mornmoot Northwood Beau (17798)
Grass Vale Golden Cream 25th	Mature	6–8–50	180	8·5	3,160	4·93	155·94	Grass Vale Gold Boy (14684)
Grass Vale Buttercup 19th	Senior 4 years	6–7–50	273	12·5	8,947	4·46	399·14	Glen Iris Golden Oxford (12694)
Grass Vale Lady Fowler 50th	Junior 4 years	16–8–50	90	22·5	2,710	5·52	149·64	Mornmoot Northwood Beau (17798)
Grass Vale Peggy's Noella	Senior 2 years	10–7–50	273	12	7,426	4·87	361·55	Belgonia Peggy 6th's Aim (17263)
Grass Vale Peggy's Nora	Senior 2 years	31–3–50	273	20	7,095	5·02	356·30	Belgonia Peggy 6th's Aim (17263)
Grass Vale Paxie's Nora	Junior 2 years	16–8–50	273	12	6,351	5·64	358·46	Mornmoot Paxie's Brigadier 3rd (2978)
Grass Vale Lady Fowler 60th	Junior 2 years	13–8–50	273	8	5,154	6·04	311·51	Mornmoot Paxie's Brigadier 3rd (2978)

Number of Cows in Average, 18. Average Milk, 6,527 lb. Average Test, 5·22 per cent. Average Butterfat, 340·67 lb.

C. E. JACKSON.

Chenar Mavis	Mature	28–7–50	273	20·5	9,016	4·81	434·10	Travalgan Starbright's Altitude (12260)
Juadine Peerless Lily 25th	Senior 4 years	5–10–49	273	10·5	6,661	6·01	400·43	Juadine Northwood Beau (19670)
Juadine Peerless Lily 26th	Junior 4 years	30–10–49	273	7·5	5,302	5·90	312·67	Juadine Northwood Beau (19670)
Juadine Peerless Lily 28th	Junior 3 years	14 11–49	240	4	3,210	6·65	213·39	Windrest Star's Aim 2nd (1017)

Number of Cows in Average, 4. Average Milk, 6,047 lb. Average Test, 5·62 per cent. Average Butterfat, 340·14 lb.

T. H. WILDING.

Mokine Beauty	Mature	3–8–50	273	23·5	9,235	4·85	448·20	Erlwin Royal Volunteer (16491)
Mokine Daisy 4th	Mature	21–7–50	273	23	6,459	4·03	260·53	Mokine Reserve (21017)
Mokine Empire's Lily 45th	Senior 4 years	14–7–50	273	9·5	6,208	4·87	302·28	Mokine Reserve (21017)
Mokine Empire's Lily 50th	Junior 2 years	4–10–49	273	17	6,261	5·63	352·63	Mokine Reserve (21017)
Mokine Empire's Twylish 22nd	Junior 2 years	16–10–49	273	16	5,598	5·96	333·86	Juadine Commander (1397)
Mokine Empire's Lily 49th	Junior 2 years	12–10–49	273	13	5,409	5·95	321·85	Mokine Reserve (21017)

Number of Cows in Average, 6. Average Milk, 6,528 lb. Average Test, 5·15 per cent. Average Butterfat, 336·56 lb.

D. G. SPARK.

Eungella Faline	Mature	13–5–50	273	22	9,246	5·13	474·78	Travalgan Starbright King (18129)
Camden Celeste	Mature	14–5–50	273	17	6,846	5·77	394·93	Greenmount Golden Bobby (18578)
Eungella Telopia	Mature	18–5–50	273	15	6,165	5·32	327·93	Travalgan Starbright King (18129)
Eungella Marlene	Mature	5–5–50	273	16·5	6,519	4·72	307·50	Hopelands Marinora's Star (20814)
Eungella Dark Venus	Mature	31–5–50	273	11	5,658	4·68	265·09	Travalgan Starbright King (18129)
Eungella Little Gem	Senior 4 years	16–5–50	273	17·5	7,202	5·45	392·91	Hopelands Marinora's Star (20814)
Eungella Miss Marinora	Senior 4 years	6–5–50	273	18	6,579	5·36	352·79	Hopelands Marinora's Star (20814)
Eungella Crystal Lily	Senior 4 years	3–4–50	273	18·5	6,250	5·47	341·85	Hopelands Marinora's Star (20814)
Eungella Miss Marinora 2nd	Junior 4 years	20–8–50	273	18	8,529	5·26	448·90	Hopelands Marinora's Star (20814)

PURE BRED HERD TESTING—continued.

COWS WHICH COMPLETED TEST DURING THE SEASON ENDED 30TH APRIL, 1951—*continued.*

JERSEYS.

Name of Cow.	Age Class.	Date of Entry to Test.	No. of Days in Test.	Weight of Milk on Last Day of Test. lb.	Weight of Milk for Period. lb.	Average Test. %	Weight of Butterfat for Period. lb.	Sire.
D. G. SPARK—continued.								
Eungella Gaiety Girl	Junior 4 years	17–6–50	273	15·5	8,416	4·69	395·09	Hopelands Marinora's Star (20814)
Eungella Ballerina	Junior 4 years	31–5–50	240	12	4,785	4·35	208·29	Hopelands Marinora's Star (20814)
Eungella Laurette	Junior 3 years	26–5–50	273	13·5	6,835	5·52	377·51	Hopelands Marinora's Star (20814)
Eungella Sparklette	Junior 3 years	28–4–50	273	13	5,184	6·19	321·21	Grass Vale Beaufighter (1323)
Eungella Olivette	Junior 3 years	30 4–50	273	15	5,900	5·32	313·89	Grass Vale Beaufighter (1323)
Eungella Babette	Junior 3 years	3·5 50	273	14	5,712	4·97	284·13	Hopelands Marinora's Star (20814)
Eungella Mignonette	Senior 2 years	26–4–50	273	16·5	5,289	5·37	283·93	Hopelands Marinora's Star (20814)
Eungella Clarionette	Senior 2 years	25–4 50	273	10·5	5,236	5·15	269·79	Hopelands Marinora's Star (20814)
Eungella Nanette	Junior 2 years	19–5–50	273	12	6,141	5·06	311·06	Grass Vale Beaufighter (1323)
Eungella Pepita 2nd	Junior 2 years	5–5 50	273	14·5	5,278	5·55	293·20	Grass Vale Royal Aim
Eungella Satinette	Junior 2 years	13–5 50	273	12	4,686	4·94	231·48	Grass Vale Royal Aim
Eungella Junette	Junior 2 years	12·6 50	273	7·5	4,707	4·59	216·29	Hopelands Marinora's Star (20814)
Eungella Fairy	Junior 2 years	7–3–50	273	11·5	4,179	5·10	213·17	Grass Vale Beaufighter (1323)
Eungella Maylette	Junior 2 years	21–7–50	180	11	3,675	4·23	155·76	Hopelands Marinora's Star (20814)

Number of Cows in Average, 23. Average Milk, 6,044 lb. Average Test, 5·16 per cent. Average Butterfat, 312·23 lb.

H. A. H. & D. G. NOON.								
Walgett Sociable Miss	Mature	27–6–50	273	14·5	6,898	5·05	384·14	Selsey Wyandotte's Prince (18058)
Rosedene Rose Marie	Mature	25–6 50	273	10·5	5,851	6·07	355·36	Walgett Pinocchio (19194)
Rosedene Golden Dawn	Mature	16 5–50	273	19	6,132	5·29	324·43	Walgett Pinocchio (19194)
Rosedene Iolanthe 3rd	Mature	3·5–50	273	14·5	5,153	6·17	318·00	Walgett Pinocchio (19194)
Rosedene Iolanthe	Mature	5–5–50	273	18·5	6,380	4·56	290·92	Rosedene Lily's Knight (19022)
Rosedene Tangerine 3rd	Mature	7–5 50	273	10·5	5,416	4·96	269·01	Walgett Pinocchio (19194)
Rosedene Tangerine 4th	Senior 4 years	7–5–50	273	16·5	5,809	5·58	324·16	Rosedene Firefly's Majestic (22307)
Rosedene Chere Marie	Junior 4 years	27 6–50	273	11	6,108	5·96	363·89	Rosedene Firefly's Majestic (22307)
Rosedene Tangerine 5th	Junior 4 years	8–5–50	273	14·5	5,323	5·00	266·03	Rosedene Firefly's Majestic (22307)
Rosedene Iolanthe 9th	Junior 3 years	1–7 50	273	9	5,052	5·88	297·28	Rosedene Firefly's Majestic (22307)
Rosedene Volunteer's Jill	Junior 2 years	18–6–50	273	13·5	4,960	5·58	277·18	Juadine Queen's Volunteer (2664)
Rosedene Volunteer's Colleen	Junior 2 years	2–7–50	273	13·5	5,305	5·00	265·68	Juadine Queen's Volunteer (2664)
Rosedene Volunteer's Rosalie	Junior 2 years	24–5–50	273	12	4,776	5·49	262·27	Juadine Queen's Volunteer (2664)
Rosedene Volunteer's Gem	Junior 2 years	16–6–50	240	10·5	4,065	4·54	184·59	Juadine Queen's Volunteer (2664)

Number of Cows in Average, 14. Average Milk, 5,516 lb. Average Test, 5·55 per cent. Average Butterfat, 305·92 lb.

T. M. SMITH.

Ardersier Wyandotte's Pride	Mature	14–7–50	240	18	6,810	6·14	418·16	Orphanage Cuba (17913)
Ardersier Snow Queen	Senior 4 years	14–7–50	240	19·5	6,510	6·37	414·66	Orphanage Cuba (17913)
Ardersier Primrose	Senior 4 years	15–7–50	180	25·5	6,030	5·82	350·87	Ardersier Northern King (20338)
Ardersier White Stockings	Senior 3 years	7–2–50	180	12	2,490	6·53	162·84	Ardersier Northern King (20338)
Ardersier Juanita	Junior 2 years	13–3–50	273	19	5,652	4·80	271·34	Orphanage Douglas (20338)
Ardersier Snowflake	Junior 2 years	1–4–50	273	16	4,928	5·39	266·26	Orphanage Douglas (18919)
Ardersier May Queen	Junior 2 years	22–5–50	273	11·5	4,309	5·39	232·52	Orphanage Douglas (18919)

Number of Cows in Average, 7. Average Milk, 5,248 lb. Average Test, 5·76 per cent. Average Butterfat, 302·38 lb.

T. O. ABBOTT.

Amaroo Helena	Mature	13–6–50	273	3·5	7,565	4·27	323·31	Eungella Golden Starbright (20666)
Amaroo Marion	Mature	3–7–50	273	3	5,859	5·43	318·41	Eungella Golden Starbright (20666)
Amaroo Cleo	Senior 3 years	11–4–50	273	13·5	6,340	5·16	327·50	Eungella Golden Starbright (20666)
Amaroo Cleopatra	Junior 3 years	19–6–50	273	11	7,143	5·40	385·97	Eungella Golden Starbright (20666)
Amaroo Chimes	Junior 3 years	16–6–50	273	9	7,212	5·19	374·56	Eungella Golden Starbright (20666)
Amaroo Joybell	Junior 3 years	15–5–50	273	9·5	5,593	4·28	239·42	Amaroo Delano (1058)
Amaroo Beauty	Senior 2 years	18–7–50	240	3·5	5,455	5·49	299·67	Eungella Golden Starbright (20666)
Amaroo Belle 2nd	Junior 2 years	28–6–50	273	8·5	6,770	4·86	329·23	Amaroo Winner (1059)
Amaroo Arachne	Junior 2 years	12–5–50	273	10·5	5,206	5·72	297·82	Amaroo Winner (1059)
Amaroo Silvermine	Junior 2 years	21–6–50	273	6·5	5,084	5·17	262·99	Amaroo Winner (1059)
Amaroo Marinora	Junior 2 years	14–5–50	273	6·5	4,324	5·82	252·06	Amaroo Winner (1059)
Amaroo Peggy	Junior 2 years	8–4–50	273	5	4,470	5·10	228·19	Amaroo Winner (1059)
Amaroo Lady	Junior 2 years	19–7–50	180	5	2,705	6·26	169·26	

Number of Cows in Average, 13. Average Milk, 5,670 lb. Average Test, 5·16 per cent. Average Butterfat, 292·95 lb.

FIELD BROS.

The Wold Princess Daisy 5th	Mature	9–5–50	273	20·5	9,646	4·87	470·23	Congelin Jolly Eminent (17397)
The Wold Starbright Grey 5th	Mature	30–4–50	273	17·5	7,937	4·85	385·90	Congelin Jolly Eminent (17397)
The Wold Fairy Lady 5th	Mature	22–4–50	273	17	7,026	5·40	379·46	Congelin Jolly Eminent (17397)
The Wold Fairy Lady 3rd	Mature	24–4–50	273	14·5	6,343	5·60	355·10	Grantham Fairy King (13765)
The Wold Fairy Crescendo 2nd	Mature	3–5–50	273	14	6,177	5·50	339·76	Grantham Fairy King (13765)
The Wold Fairy Lady 4th	Mature	24–7–50	273	10·5	6,751	4·87	329·16	Grantham Fairy King (13765)
The Wold Jolly Mooltha 2nd	Mature	11–5–50	273	13	6,144	5·16	317·20	Congelin Jolly Eminent (17397)
The Wold Happy Starbright 2nd	Mature	26–4–50	273	17·5	6,637	4·69	311·16	Congelin Jolly Eminent (17397)
The Wold Jolly Minnie	Mature	25–5–50	180	14·5	4,080	5·78	235·95	Congelin Jolly Eminent (17397)
The Wold Jolly Mooltha 3rd	Senior 4 years	27–6–50	240	12·5	7,140	4·30	307·14	Congelin Jolly Eminent (17397)
The Wold Starbright Gray 7th	Senior 4 years	13–6–50	210	16·5	5,850	5·10	298·17	Congelin Jolly Eminent (17397)
The Wold Daisy Northwood 4th	Senior 4 years	30–5–50	240	7·5	5,775	5·02	290·28	Congelin Jolly Eminent (17397)
The Wold Daisy Grey 6th	Senior 4 years	25–4–50	210	21·5	5,265	5·15	271·32	Congelin Jolly Eminent (17397)
The Wold Princess Daisy 6th	Junior 4 years	19–7–50	273	14·5	7,828	5·71	447·08	Congelin Jolly Eminent (17397)
The Wold Daisy Grey 7th	Senior 3 years	22–4–50	273	13	5,784	5·46	315·88	Congelin Jolly Eminent (17397)
The Wold Starbright Daisy 3rd	Senior 3 years	14–4–50	273	14	5,997	4·89	293·61	Congelin Jolly Eminent (17397)
The Wold Fairy Princess 4th	Senior 3 years	2–7–50	240	13	6,675	4·28	286·14	Congelin Jolly Eminent (17397)
The Wold Golden Minnie	Senior 3 years	25–6–50	240	8·5	5,850	4·67	273·54	Grass Vale Balkan Prince (1321)
The Wold Princess Daisy 7th	Senior 3 years	11–6–50	210	23·5	5,880	4·35	255·96	Congelin Jolly Eminent (17397)
The Wold Fairy Lady 6th	Senior 3 years	18–5–50	240	12	5,085	4·62	234·75	Congelin Jolly Eminent (17397)
The Wold Easter Daisy 5th	Junior 3 years	22–7–50	273	12·5	7,042	5·62	395·95	Grass Vale Balkan Prince (1321)
The Wold Princess Daisy 8th	Senior 2 years	14–5–50	273	7·5	5,572	5·23	291·47	Grass Vale Balkan Prince (1321)

PURE BRED HERD TESTING—continued.

COWS WHICH COMPLETED TEST DURING THE SEASON ENDED 30TH APRIL, 1951—*continued.*

JERSEYS.

Name of Cow.	Age Class.	Date of Entry to Test.	No. of Days in Test.	Weight of Milk on Last Day of Test. lb.	Weight of Milk for Period. lb.	Average Test. %	Weight of Butterfat for Period. lb.	Sire.
FIELD BROS.—continued.								
The Wold Starbright Daisy 4th	Senior 2 years	18–5–50	150	12	2,930	5·59	164·04	Grass Vale Balkan Prince (1321)
The Wold Starbright Gray 11th	Junior 2 years	20–5–50	273	14	6,582	5·14	338·49	Grass Vale Balkan Prince (1321)
The Wold Fairy Lady 10th	Junior 2 years	25–5–50	240	14	5,625	4·66	262·22	Grass Vale Balkan Prince (1321)
The Wold Golden Ada	Junior 2 years	22–6–50	240	8	4,545	5·17	235·20	Grass Vale Balkan Prince (1321)
The Wold Daisy Grey 9th	Junior 2 years	20–6–50	240	10	4,635	4·97	230·49	Grass Vale Balkan Prince (1321)
The Wold Golden Ada 2nd	Junior 2 years	8–6–50	240	8·5	4,320	5·18	223·71	Grass Vale Balkan Prince (1321)
The Wold Goden Crescendo 3rd	Junior 2 years	8–6–50	210	13·5	4,065	5·44	221·32	Grass Vale Balkan Prince (1321)
The Wold Golden Starbright 2nd	Junior 2 years	11–5–50	273	11·5	4,639	4·64	215·44	Grass Vale Balkan Prince (1321)
The Wold Golden Starbright 3rd	Junior 2 years	9–6–50	210	13·5	4,155	5·03	208·95	Grass Vale Balkan Prince (1321)
The Wold Fairy Lady 8th	Junior 2 years	20–6–50	240	5	4,515	4·34	196·08	Grass Vale Balkan Prince (1321)
The Wold Starbright Daisy 5th	Junior 2 years	1–6–50	210	14	3,675	5·15	189·18	Grass Vale Balkan Prince (1321)
The Wold Golden Mooltha 2nd	Junior 2 years	3–7–50	210	9	3,675	5·13	188·55	Grass Vale Balkan Prince (1321)
The Wold Starbright Gray 12th	Junior 2 years	27–6–50	210	8·5	3,375	4·99	168·42	Grass Vale Balkan Prince (1321)
The Wold Golden Mooltha	Junior 2 years	15–5–50	150	8	2,100	4·13	86·70	Grass Vale Balkan Prince (1321)
Number of Cows in Average, 36. Average Milk, 5,537 lb. Average Test, 5·02 per cent. Average Butterfat, 278·16 lb.								
K. V. GRAY.								
Juadine Fairy	Mature	14–7–50	273	3·5	6,745	6·19	417·27	Juadine Northwood Beau (19670)
Camden Circe	Mature	30–5–50	273	12·5	7,072	5·86	414·25	Greenmount Golden Sultan (14688)
Juadine Queen 2nd	Mature	7–5–50	273	13	6,234	5·59	348·30	Juadine Northwood Beau (19670)
Grass Vale Lady Fowler 41st	Mature	14–4–50	273	6·5	4,789	5·35	256·30	Mornmoot Northwood Beau (17798)
Mokine Empire Lily 35th	Mature	2–12–49	210	10·5	4,350	4·63	201·42	Selsey Hall Boy (15136)
Juadine Queen 3rd	Mature	18–2–50	120	21·5	3,110	5·39	167·79	Juadine Volunteer (20842)
Juadine Peerless Lily 24th	Mature	9–3–50	120	9·5	2,295	5·20	119·37	Juadine Northwood Beau (19670)
Juadine Julienne 4th	Mature	28–5–50	150	7	1,695	5·01	84·99	Juadine Northwood Beau (19670)
Yalebra Roma	Senior 4 years	30–3–50	273	14	6,707	5·34	358·50	Greenmount Golden Patch (19603)
Grantham Peerless Fairy	Junior 3 years	2–4–50	273	14	6,402	5·62	360·11	Juadine Volunteer (20482)
Yalebra Queen 3rd	Junior 3 years	5–11–49	240	8	3,960	4·86	192·57	Juadine Volunteer (20482)
Yalebra Lady Fowler	Junior 2 years	2–12–49	273	16	5,628	4·68	263·91	Mornmoot Pixie's Brigadier 3rd (17680)
Yalebra Lady Diana	Junior 2 years	3–12–49	273	13	4,614	4·59	211·98	Belgonia Peggy 6th's Aim (17263)
Yalebra Dewdrop	Junior 2 years	3–8–50	240	2·5	3,007	5·84	175·56	Nyroca Lily's Design (1607)
Yalebra Beauty	Junior 2 years	14–7–50	273	3	3,594	4·83	173·53	Nyroca Lily's Design (1607)
Number of Cows in Average, 13. Average Milk, 4,984 lb. Average Test, 5·34 per cent. Average Butterfat, 266·53 lb.								

M. S. BROOKING.

Walgett Handsome Girl 31st	Mature	19–5–50	273	12	7,846	4·06	318·45	Selsey Wyandotte's Prince (18058)
Walgett Handsome Girl 40th	Mature	19–7–50	210	23	7,665	4·03	309·03	Selsey Wyandotte's Prince (18058)
Travalgan Starbright 31st	Mature	19–9–50	150	27·5	5,580	5·26	293·49	Mornmoot Laver (17792)
Travalgan Lady Eion 16th	Mature	17–7–50	210	13·5	4,680	4·64	217·29	Glen Iris Golden Oxford (12694)
Walgett Handsome Girl 28th	Mature	16–7–50	210	10	4,470	4·43	197·91	Selsey Wyandotte's Prince (18058)
Grass Vale Lady Fowler 42nd	Mature	1–5–50	120	24	3,900	4·36	170·04	Mornmoot Northwood Beau (17798)
Carydale Patsy's Pride	Mature	29–4–50	90	20	2,325	5·43	126·27	Carydale Bidomak (20529)
Travalgan Lady Eion 34th	Senior 4 years	22–5–50	273	17·5	7,907	4·80	380·26	Mornmoot Laver (17792)
Travalgan Starbright 29th	Senior 4 years	30 4–50	273	17·5	7,972	4·76	379·33	Mornmoot Laver (17792)
Travalgan Lady Eion 30th	Senior 4 years	23–4–50	273	14	6,927	4·92	340·78	Mornmoot Laver (17792)
Hopelands Buttercup 2nd	Junior 4 years	9–8–50	210	16	7,215	4·13	298·17	Hopelands Pattern (18264)
Chillwell Lilac Model 2nd	Junior 3 years	24–6–50	210	8	4,110	5·93	243·97	Travalgan Leader (958)
Chillwell Forget-me-not	Junior 3 years	17–9–50	150	17·5	3,540	5·19	183·69	Travalgan Leader (958)
Chillwell Ivy	Senior 2 years	30–8–50	180	15	3,915	5·06	198·48	Travalgan Leader (958)
Chillwell Hovea Madeira 3rd	Junior 2 years	17–5–50	273	10·5	5,611	5·82	326·86	Travalgan Leader (958)
Travalgan Lady Mint 13th	Junior 2 years	25–8–50	180	17	5,565	4·44	247·17	Mornmoot Northwood Beau (17798)
Hopelands Eileen	Junior 2 years	7–9–50	180	17	4,560	4·70	214·38	Bemersyde Designer (2035)
Travalgan Starbright 46th	Junior 2 years	4–9–50	180	17	4,500	4·74	213·48	Mornmoot Northwood Beau (17798)
Hopelands Sweet Belle 3rd	Junior 2 years	13–8–50	210	13	4,610	4·37	201·57	Bemersyde Designer (2035)
Chillwell Molly's Fuschia	Junior 2 years	18–5–50	150	14·5	3,420	5·06	173·01	Travalgan Leader (958)

Number of Cows in Average, 18. Average Milk, 5,560 lb. Average Test, 4·73 per cent. Average Butterfat, 263·35 lb.

MRS. M. A. CRUTE.

Murra Murra Silver Lady	Mature	29–4–50	273	18·5	6,340	4·74	300·55	The Wold Northwood King (19138)
Murra Murra Easter's Marina	Mature	20 3–50	273	15·5	5,131	5·55	284·73	Grantham Easter's Monarch (11656)
Murra Murra Princess Royal	Mature	30–4–50	210	20·5	4,560	4·79	218·58	Grantham Easter's Monarch (11656)
Murra Murra Easter's Marita	Mature	1 4–50	240	22·5	5,160	4·11	212·25	Grantham Easter's Monarch (11656)
Murra Murra Northwood Dewdrop 2nd	Junior 4 years	22 5–50	240	14	5,760	4·90	283·68	The Wold Northwood King (19138)
Murra Murra Marinora	Junior 4 years	19–7–50	180	25	5,355	4·12	220·44	The Wold Northwood King (19138)
Murra Murra Marinita 2nd	Junior 4 years	3–7–50	180	17	4,440	4·92	218·70	The Wold Northwood King (19138)
Murra Murra Silver Bell 2nd	Junior 4 years	23–8–50	150	19·5	4,050	4·69	190·14	The Wold Northwood King (19138)
Murra Murra Royal Lady 2nd	Senior 3 years	15–6–50	210	15	4,530	4·99	226·20	The Wold Northwood King (19138)
Murra Murra Winsome Lady	Junior 3 years	28–9–50	120	24·5	4,005	4·53	181·53	The Wold Northwood King (19138)
Murra Murra Marinora 3rd	Junior 2 years	9–11–50	60	13·5	870	4·76	41·40	The Wold Northwood King (19138)

Number of Cows in Average, 9. Average Milk, 5,034 lb. Average Test, 4·75 per cent. Average Butterfat, 239·47 lb.

B. LANGRIDGE.

Mereworth Charming Pat	Mature	13 4–50	273	16	5,913	5·23	309·53	Navua Coronation Star (14929)
Grantham Silvermine 4th	Mature	10–3–50	273	6	5,283	4·24	223·91	Rosecliffe Marchalong (15094)
Mereworth Dreaming Silvermine	Mature	20–10–49	240	6·5	4,860	4·54	220·74	Navua Coronation Star (14929)
Juadine Peerless Lily 27th	Senior 4 years	2–12–49	210	6·5	3,825	5·00	191·43	Juadine Northwood Beau (19670)
Mereworth Wonderful Nancy	Junior 4 years	23–2–50	120	8·5	2,235	5·28	118·11	Juadine Volunteer (20842)
Mereworth Marchalong Fondant	Senior 3 years	12–3–50	273	10	4,995	4·62	230·65	Grantham Easter's Marchalong (20736)
Mereworth Butter Queen 11th	Junior 3 years	7–3–50	273	8·5	4,060	5·11	207·53	Grantham Easter's Marchalong (20736)
Mereworth Oxford Silvermine 2nd	Junior 3 years	9–3–50	240	3·5	3,390	5·13	173·88	Mereworth Fondant's Oxford (1537)
Mereworth Coronation Montrose 2nd	Senior 2 years	10–2–50	180	3·5	2,040	5·26	107·40	Mereworth Coronation Oxford 2nd (2920)
Mereworth March Princess	Junior 2 years	11–4–50	273	14·5	5,503	4·89	269·01	Grantham Easter's Marchalong (20736)
Merewoth Vanilla Flower	Junior 2 years	17–10–49	240	11·5	5,145	4·92	253·25	Grantham Easter's Marchalong (20736)
Mereworth Volunteer's Silvermine	Junior 2 years	23–11–49	273	12	4,596	4·71	216·71	Juadine Volunteer (20842)
Mereworth Dreaming Coronation	Junior 2 years	3–11–49	240	7·5	3,555	5·47	194·51	Navua Coronation Star (14929)
Mereworth Silvermine's Friendship	Junior 2 years	22–10–49	240	6·5	2,625	5·63	147·97	Rosecliffe Marchalong (15094)

Number of Cows in Average, 13. Average Milk, 4,463 lb. Average Test, 4·95 per cent. Average Butterfat, 221·12 lb.

PURE BRED HERD TESTING—continued.

COWS WHICH COMPLETED TEST DURING THE SEASON ENDED 30TH APRIL, 1951—*continued.*

JERSEYS.

Name of Cow.	Age Class.	Date of Entry to Test.	No. of Days in Test.	Weight of Milk on Last Day of Test. lb.	Weight of Milk for Period. lb.	Average Test. %	Weight of Butterfat for Period. lb.	Sire.
DAVIES & SONS.								
Juadine Queen	Mature	15–3–50	273	13	4,109	5·47	224·76	Austral Park Wonderful Standard (12423)
Burlington Dairymaid 3rd	Mature	19–7–50	180	3·5	3,855	5·42	209·01	Lawrenny Johnnie (16670)
Mokine Empire's Lily 40th	Mature	16–7–50	180	5·5	3,585	5·01	180·00	Mokine Royal Dick (21018)
Juadine March Flower 3rd	Mature	8–9–50	150	5	3,075	4·81	147·96	Juadine Northwood Beau (19670)
Mokine Empire's Lily 37th	Mature	29–10–50	90	3·5	1,245	3·22	40·05	Mokine Brigadier (18799)
Mokine Empire's Twylish 20th	Junior 4 years	28–6–50	273	2·5	3,127	5·38	168·42	Mokine Brigadier (18799)
Vinewood Duchess Royal	Senior 3 years	9–7–50	273	1·5	2,509	5·38	135·16	Glenavon Diana's Lord
Sunnyhurst Twylish	Senior 2 years	21–5–50	210	6·5	3,360	5·43	182·46	Mokine Reserve (21017)
Number of Cows in Average, 7.	Average Milk, 3,374 lb.		Average Test, 5·28 per cent.				Average Butterfat, 178·25 lb.	
W. L. BRADFORD.								
Kapara Dairymaid 2nd	Mature	2–8–50	180	24·5	5,860	4·27	250·11	Congelin Jolly Eminent 3rd (18425)
Kapara Duchess 2nd	Mature	23–4–50	273	13	5,024	4·54	228·04	Congelin Jolly Eminent 3rd (18425)
Kapara Sparkle 4th	Mature	21–4–50	273	10·5	4,576	5·54	207·89	Congelin Jolly Eminent 3rd (18425)
Kapara Dairymaid 3rd	Mature	14–10–50	120	27	4,245	4·87	206·64	Congelin Mandarin (14542)
Kapara Firefly 2nd	Mature	17–3–40	273	12	4,386	3·81	167·35	Congelin Mandarin (14542)
Kapara Sparkle's Lassie 2nd	Mature	16–3–50	273	14·5	4,348	3·44	149·48	Congelin Jolly Eminent 3rd (18425)
Kapara Sparkle's Lassie 3rd	Mature	30–3–50	240	8·5	3,270	4·12	134·78	Congelin Jolly Eminent 3rd (18425)
Kapara Rosebud 2nd	Mature	10–3–50	240	7	2,205	4·46	98·34	Congelin Jolly Eminent 3rd (18425)
KaparaValentine 2nd	Senior 3 years	19–4–50	273	12	3,921	4·04	158·52	Grass Vale Twylish Lad (21816)
Kapara Sweet Nell	Senior 3 years	10–3–50	150	6·5	1,425	4·08	58·26	Grass Vale Twylish Lad (21816)
Kapara Twylish Lady	Senior 2 years	3–6–50	240	13	4,725	5·14	243·03	Kapara Eminent's Mariner 3rd (1422)
Nerrin Nerrin Talisman	Senior 2 years	17–4–50	273	13	4,269	5·45	232·92	Grass Vale Twylish Lad (21816)
Nerrin Dainty Lady	Senior 2 years	7–6–50	240	8	4,305	4·45	191·76	Grass Vale Twylish Lad (21816)
Nerrin Nerrin Gaiety	Senior 2 years	31–3–50	273	9	3,612	4·45	160·76	Kapara Eminent Mariner 3rd (1422)
Nerrin Nerrin Victorious	Senior 2 years	8–4–50	273	8·5	3,515	3·92	137·88	Congelin Washington (18426)
Nerrin Nerrin Carnation	Junior 2 years	17–8–50	180	19	4,320	4·83	208·59	Grass Vale Buttercup's Beau (2506)
Nerrin Nerrin Happy Lass	Junior 2 years	24–4–50	273	10	4,545	4·31	195·89	Grass Vale Buttercup's Beau (2506)
No. of cows in Average 16.	Average Milk, 4,019 lb.		Average Test, 4·39 per cent.				Average Butterfat, 176·47 lb.	

RADFORD PARK CO.

Radford Park Daphne	Mature	12–7–50	180	10·5	6,135	4·88	299·67	Grass Vale Golden Lad (19599)
Radford Park Poppy Queen	Mature	15–4–50	240	3	3,330	5·16	171·90	Mokine Dunce (11896)
Radford Park Pansy	Mature	25–7–50	180	4	3,510	4·51	158·40	Grass Vale Golden Lad (19599)
Radford Park Boronia	Mature	29–9–50	120	8	2,595	4·23	109·77	Grass Vale Golden Lad (19599)
Radford Park Rose	Mature	27–9–50	90	2	1,260	6·74	84·99	Grass Vale Golden Lad (19599)
Woodendale Ragtime's Violet	Mature	8–10–50	150	2	1,800	4·40	79·23	Spring Park Prince Ragtime (5942)
Radford Park Daisy	Mature	19–6–50	90	8	1,470	5·24	77·10	Grass Vale Golden Lad (19599)
Radford Park Marigold	Mature	1–10–50	120	2·5	930	4·83	44·91	Mokine Dunce (11896)
Shepstone Lily Christabel 10th	Senior 3 years	24–3–50	273	18	6,144	4·71	289·66	Shepstone Royal Reserve (20155)
Shepstone Signature	Junior 3 years	23–4–50	273	7	4,761	5·23	249·12	Shepstone Royal Reserve (20155)
Radford Park Snowdrop	Junior 3 years	30–4–50	150	7	2,010	4·94	99·42	Grass Vale Golden Lad (19599)
Shepstone Bell Signita	Junior 3 years	8–10–50	90	8	1,350	3·67	49·62	Shepstone Double Reserve (21246)
Radford Park Sweet Pea	Senior 2 years	6–4·50	180	2	1,140	3·79	43·26	Grass Vale Havelock (1326)
Radford Park Tulip	Junior 2 years	24–6–50	180	2	3,270	4·06	132·96	Grass Vale Havelock (1326)
Radford Park Ivy	Junior 2 years	11–7–50	150	6	2,480	4·75	117·87	Grass Vale Golden Lad (19599)
Radford Park Petunia	Junior 2 years	9–9–50	90	12·5	1,395	3·67	51·18	Grass Vale Havelock (1326)

Number of Cows in Average, 10. Average Milk, 3,458 lb. Average Test, 4·17 per cent. Average Butterfat, 144·15 lb.

N. W. HAYLES.

Carydale Centenary Girl	Mature	13–3–50	210	19·5	3,645	4·77	173·85	Carydale Bidomak (20529)
Juadine Jewel 5th	Mature	28–7–50	90	37·5	3,075	5·21	160·44	Juadine Northwood Beau (19670)
Carydale Precious	Mature	23–4–50	180	18	3,600	4·19	151·14	Hopeland's Pattern (18624)
Carydale Royal Queen	Mature	22–9–50	30	42·5	1,275	4·50	57·39	Juadine Royal (20841)
Carydale Royal Twinkle	Junior 4 years	7–7–50	90	32·5	3,180	4·67	149·82	Juadine Royal (20841)
Carydale Royal Mischief	Senior 3 years	13–3–50	210	9	2,340	4·69	109·92	Juadine Royal (20841)
Carydale Royal Fairy	Junior 3 years	7–5–50	180	16·5	3,015	4·91	147·99	Juadine Royal (20841)
Carydale Lace Pattern	Junior 3 years	18–4–50	180	19	2,670	5·12	136·74	Hopelands Pattern (18624)
Carydale Royal Patsy	Junior 2 years	10–5–50	150	22·5	2,790	4·75	132·54	Juadine Royal (20841)

Number of Cows in Average, 6. Average Milk, 3,010 lb. Average Test, 4·71 per cent. Average Butterfat, 142·03 lb.

AUSTRALIAN ILLAWARRA SHORTHORNS.

J. H. BENSTED & CO.

Valliere Dairymaid	Mature	28–4–50	273	31	14,178	4·05	574·53	Valliere Skipton (7595)
Capel Daphne's Pet 2nd	Senior 4 years	15–4–50	273	14·5	11,393	3·44	392·54	Capel Star King (4673)
Tirano Ivy 2nd	Junior 4 years	18–8–50	240	8	8,580	4·21	361·11	Worroloo Red Leo 2nd (7660)
Tirano Katoomba 3rd	Junior 4 years	1 5–50	273	21·5	8,224	4·13	339·43	Wooroloo Clansman (8874)
Southlyn Pearl	Senior 3 years	22–4–50	273	31	11,523	4·24	488·88	Summerlea Masterly (9914)
Tirano Melba 2nd	Senior 3 years	21–4–50	273	11	9,888	3·95	390·84	Wooroloo Red Leo 2nd (7660)
Tirano Emma 2nd	Senior 3 years	1–5–50	240	21·5	9,165	4·05	370·89	Wooroloo Red Leo 2nd (7660)
Tirano Roma's Pride 2nd	Senior 3 years	28–4–50	273	10	9,150	3·67	335·46	Wooroloo Red Leo 2nd (7660)
Tirano Madame 2nd	Senior 3 years	19–4–50	240	18	7,785	4·08	317·76	Wooroloo Red Leo 2nd (7660)
Southlyn Rose	Senior 2 years	21–4–50	273	21·5	9,349	4·17	389·92	Summerlea Masterly (9914)
Southlyn Bella	Senior 2 years	15–5–50	273	19·5	9,493	4·05	384·59	Tipperary Ace (6336)
Southlyn Dolly	Senior 2 years	23–5–50	120	14	1,935	4·01	77·67	Summerlea Masterly (9914)

Number of Cows in Average, 11. Average Milk, 9,884 lb. Average Test, 3·99 per cent. Average Butterfat, 395·08 lb.

PURE BRED HERD TESTING—continued.

COWS WHICH COMPLETED TEST DURING THE SEASON ENDED 30TH APRIL, 1951—*continued.*

AUSTRALIAN ILLAWARRA SHORTHORNS.

Name of Cow.	Age Class.	Date of Entry to Test.	No. of Days in Test.	Weight of Milk on Last Day of Test. lb.	Weight of Milk for Period. lb.	Average Test. %	Weight of Butterfat for Period. lb.	Sire.
M. H. MONTGOMERY.								
Tipperary Dove 33rd	Mature	17–11–49	273	26	9,468	3·72	352·08	Liberton Venturer 2nd (7182)
Tipperary Beauty 13th	Mature	4–10–49	273	16	8,208	4·25	349·12	Blackland's Monarch's Commander (1877)
Inverell Violet	Mature	14–10–49	273	21	7,953	4·00	318·36	Liberton Venturer 2nd (7132)
Glanavon Maggie 2nd	Mature	15–6–50	180	31	7,860	3·31	260·79	Blackland's Monarch's Commander (1877)
Tabbagong Beauty 54th	Senior 4 years	13–7–50	273	31·5	14,254	4·42	629·64	Tabbagong Lawrence (9965)
Montaro Pansy	Senior 4 years	14–1–50	273	24	8,427	4·19	352·85	Glanavon Tudor (8123)
Montaro Olive	Senior 3 years	13–3–50	273	26	9,243	3·67	339·33	River Glen Marksman (8604)
Montaro Beauty 2nd	Senior 3 years	31–5–50	150	29	3,915	3·79	148·41	River Glen Marksman (8604)
Montaro Princess 2nd	Junior 3 years	17–3–50	273	20·5	6,726	4·02	270·22	River Glen Marksman (8604)
Montaro Kitty 2nd	Junior 3 years	11–3–50	240	19·5	6,240	4·08	254·78	River Glen Marksman (8604)
Montaro Lovely	Senior 2 years	14 11–49	273	20	7,950	4·25	338·06	River Glen Marksman (8604)
Montaro Pretty Maid 2nd	Senior 2 years	14–11–49	273	18	6,834	4·69	320·63	River Glen Marksman (8604)
Montaro Robin	Senior 2 years	11–5–50	273	17	7,656	3·71	284·30	River Glen Marksman (8604)
Montaro Pansy 2nd	Senior 2 years	11–6–50	150	48·5	5,940	3·71	220·14	River Glen Marksman (8604)
Montaro Fairy 4th	Junior 2 years	11–10–49	273	43	12,059	4·48	540·98	River Glen Marksman (8604)
Montaro Beauty 4th	Junior 2 years	15 10–49	273	17	6,681	4·21	281·08	River Glen Marksman (8604)
Number of Cows in Average, 16.		Average Milk, 8,088 lb.			Average Test, 4·07 per cent.		Average Butterfat, 328·79 lb.	
ESTATE OF E. L. BROCKMAN.								
Westlawn Delia	Mature	26–7–50	273	11	7,938	4·36	345·91	Westlawn Kinsman (7632)
Westlawn Fairy	Mature	23–5–50	273	18	9,534	3·45	323·85	Telyarup Roosevelt (1538)
Westlawn Twinkle	Mature	24–7–50	210	15	6,975	3·82	265·70	Glanavon Pilot (5747)
Westlawn Primrose	Senior 4 years	28–3–50	273	14·5	7,633	3·82	291·86	Basildene Wavell 2nd (7763)
Westlawn Princess	Junior 3 years	13–7–50	180	9	3,960	3·77	149·34	Basildene Wavell 2nd (7763)
Westlawn Freda	Senior 2 years	10–4–50	273	12	5,916	3·45	204·04	Wooroloo Viking (10120)
Westlawn Desma	Junior 2 years	5–9–50	120	12·5	1,725	3·78	65·30	Wooroloo Viking (10120)
Number of Cows in Average, 6.		Average Milk, 6,993 lb.			Average Test, 3·78 per cent.		Average Butterfat, 264·45 lb.	
K. I. PROWSE.								
Capel Fairy 3rd	Mature	27–11–49	273	13	8,289	4·27	353·79	Capel Lotties Reward (3782)
Wattlehill May Day	Mature	29–5–50	273	12	9,261	3·55	328·34	Wallatin Ninetysix (7607)
Capel Gibson Girl	Mature	20–5–50	273	9	6,837	4·16	284·31	Valliere Commodore (6360)
Wattlehill Red Rose	Mature	20–4–50	273	18·5	7,660	3·42	262·32	Wallatin Ninetysix (7607)
Wattlehill Princess	Mature	27–6–50	240	9	7,425	3·34	247·95	Wallatin Ninetysix (7607)
Campania Lulu	Mature	6–5–50	240	15	6,705	3·24	217·35	Longridge Triumph (5932)
Yokanup Lupin	Mature	2–6–50	60	50·5	3,030	4·05	122·94	Parkview Commodore (306)
Wattlehill Grace	Mature	24 6–50	240	5·5	5,280	3·50	185·04	Capel Cinderella King 2nd (7892)
Wattlehill Florence	Junior 3 years	3–7–50	273	16·5	6,304	3·20	202·12	Capel Cinderella Kind 2nd (7892)

Wattlehill Patchy	Senior 4 years	22-5-50	180	16	5,670	3·62	205·29	Wallatin Ninetysix (7607)
Wattlehill Red Correll	Junior 4 years	4-6-50	273	10·5	6,616	3·97	262·75	Capel Cinderella King 2nd (7892)
Wattlehill Red Girl	Junior 4 years	21-9-50	120	27	4,945	3·09	153·06	Capel Cinderella King 2nd (7892)
Wattlehill Princess Maid	Senior 3 years	25-3-50	273	17	7,296	3·73	271·87	Capel Cinderella King 2nd (7892)
Wattlehill Margaret	Junior 3 years	9-6-50	273	12·5	5,992	4·03	241·68	Capel Cinderella King 2nd (7892)
Wattlehill Red Girl	Junior 3 years	14-11-49	240	10·5	6,205	3·72	230·61	Capel Cinderella Kind 2nd (7892)
Wattlehill Star Girl	Senior 2 years	30-7-50	273	15	6,540	3·77	246·29	Wallatin Ninetysix (7607)
Hades Tena's Pride	Senior 2 years	29-7-50	273	9·5	5,218	3·92	204·43	Yanget Marquis (2983)
Wattlehill Rosemary 2nd	Junior 2 years	22-10-49	273	19	5,087	4·05	206·11	Wallatin Ninetysix (7607)

Number of Cows in Average, 16. Average Milk, 7,337 lb. Average Test, 3·36 per cent. Average Butterfat, 246·89 lb.

CLAREMONT HOSPITAL FOR INSANE.

Claremont Whitby Maid 48th	Mature	1-7-50	273	24	10,737	3·31	355·74	Westby Monarch (5404)
Claremont Maggie Morrison 48th	Mature	4-2-50	273	29	10,407	3·36	350·05	Summerlea Churchill (6236)
Claremont Mabel 29th	Mature	5 1 50	273	18	8,754	3·85	337·51	Westby Monarch (5404)
Claremont Treasure 30th	Mature	14-2-50	273	22·5	8,002	4·07	325·82	Westby Monarch (5404)
Claremont Maggie Morrison 49th	Mature	2-7-50	273	15·5	8,296	3·69	306·27	Westby Monarch (5404)
Claremont Maggie Morrison 41st	Mature	2-6-50	273	21	7,908	3·71	293·52	Westby Monarch (5404)
Claremont Cocky 21st	Mature	17-5-50	273	20	8,565	3·41	292·25	Wooroloo Triumph (3627)
Claremont Biddy 60th	Mature	28-4-50	273	21	8,163	3·52	287·74	Westby Monarch (5404)
Claremont Treasure 43rd	Mature	28-12-49	273	25	8,430	3·40	287·25	Westby Monarch (5404)
Claremont Treasure 42nd	Mature	8-11-49	273	23	8,064	3·54	285·73	Westby Monarch (5404)
Claremont Pinafore 18th	Mature	27-10-49	273	24	7,962	3·58	285·09	Glanavon Dunster (6867)
Claremont Whitby Maid 58th	Mature	26-11-49	273	24	8,637	3·30	284·76	Westby Masterpiece (5403)
Claremont Maggie Morrison 67th	Mature	5-5-50	273	22	8,136	3·46	281·72	Westby Monarch (5404)
Claremont Cocky 31st	Mature	17-11-49	273	24	7,497	3·74	280·83	Westby Monarch (5404)
Claremont Poppy 27th	Mature	11-5-50	273	23	8,514	3·27	278·65	Summerlea Churchill (6236)
Claremont Cleggett 24th	Mature	19-2-50	273	19	7,527	3·69	278·01	Westby Masterpiece (5403)
Claremont Pinafore 19th	Mature	23-10-49	273	26	8,598	3·23	277·37	Westby Monarch (5404)
Claremont Cocky 27th	Mature	23-6-50	273	23	8,349	3·30	275·85	Westby Monarch (5404)
Claremont Pinafore 20th	Mature	3-6-50	273	19·5	8,143	3·28	267·26	Westby Masterpiece (5403)
Claremont Cherry 15th	Mature	8-6-50	273	16·5	6,919	3·72	257·76	Claremont Max Hero (3802)
Claremont Cherry 41st	Mature	28-5-50	273	18	7,419	3·45	256·12	Westby Monarch (5404)
Claremont Blossom 45th	Mature	29-7-50	273	16	6,903	3·70	255·58	Claremont Woodrow (7958)
Claremont Maggie Morrison 65th	Mature	18-4-50	273	18	7,389	3·41	252·31	Westby Masterpiece (5403)
Claremont Treasure 33rd	Mature	10-3-50	273	15	7,965	3·11	247·77	Summerlea Churchill (6236)
Claremont Star 33rd	Mature	7-5-50	273	18	8,034	3·00	241·14	Summerlea Churchill (6236)
Claremont Maggie Morrison 60th	Mature	13-2-50	273	12·5	6,637	3·63	240·79	Westby Monarch (5404)
Claremont Belle 39th	Mature	22-11-49	273	29	7,927	2·95	233·71	Westby Masterpiece (5403)
Claremont Whitby Maid 61st	Mature	12-2-50	273	13·5	6,790	3·02	205·28	Westby Masterpiece (5403)
Claremont Cleggett 25th	Mature	25-7-50	120	28	4,620	3·89	179·70	Westby Masterpiece (5403)
Claremont Clarie 5th	Mature	1-2-50	210	21·5	5,220	3·12	163·11	Westby Masterpiece (5403)
Claremont Whitby Maid 51st	Mature	19-11-50	60	25·5	1,920	3·79	72·87	Summerlea Churchill (6236)
Claremont Blossom 44th	Mature	11-9-50	60	20·5	1,575	2·95	46·44	Westby Monarch (5404)
Claremont Belle 44th	Senior 4 years	26-11-49	273	27	7,851	4·22	331·62	Glanavon Dunster (6867)
Claremont Cherry 42nd	Senior 4 years	1-11-49	273	26	8,388	3·61	302·72	Westby Masterpiece (5403)
Claremont Star 36th	Senior 4 years	2-12-49	273	25	8,025	3·59	288·19	Westby Masterpiece (5403)
Claremont Pinafore 21st	Senior 4 years	4-11-49	273	25	8,085	3·39	274·62	Westby Monarch (5404)
Claremont Poppy 42nd	Senior 4 years	1-12-49	273	25	8,610	3·13	269·85	Westby Masterpiece (5403)
Claremont Cherry 45th	Senior 4 years	23-11-49	273	19	6,622	4·05	268·32	Glanavon Dunster (6867)
Claremont Stella 14th	Senior 4 years	9-2-50	273	14·5	7,183	3·42	245·46	Claremont Witton's Choice (7957)
Claremont Biddy 86th	Senior 4 years	16-2-50	273	10·5	7,006	3·44	241·32	Glanavon Dunster (6867)
Claremont Biddy 88th	Senior 4 years	20-7-50	273	18	7,374	3·24	238·87	Westby Masterpiece (5403)
Claremont Maggie Morrison 68th	Senior 4 years	2-1-50	273	19	7,557	2·98	225·39	Westby Masterpiece (5403)
Claremont Cherry 44th	Senior 4 years	8-11-49	273	15	6,685	3·37	225·27	Westby Monarch (5404)

PURE BRED HERD TESTING—continued.

COWS WHICH COMPLETED TEST DURING THE SEASON ENDED 30TH APRIL, 1951—*continued.*

AUSTRALIAN ILLAWARRA SHORTHORNS.

CLAREMONT HOSPITAL FOR INSANE—continued.

Name of Cow.	Age Class.	Date of Entry to Test.	No. of Days in Test.	Weight of Milk on Last Day of Test. lb.	Weight of Milk for Period. lb.	Average Test. %	Weight of Butterfat for Period. lb.	Sire.
Claremont Blossom 48th	Senior 4 years	28-3-50	273	20·5	7,321	2·96	216·91	Westby Monarch (5404)
Claremont Cherry 46th	Senior 4 years	29-7-50	273	11·5	5,404	3·73	201·58	Capel Monarch (5404)
Claremont Blossom 49th	Senior 4 years	6-3-50	90	30	2,730	3·25	88·74	Westby Masterpiece (5403)
Claremont Treasure 47th	Junior 4 years	12-11-49	273	26	8,133	3·32	269·71	Westby Monarch (5404)
Claremont Blossom 47th	Junior 4 years	22-11-49	273	17	6,366	3·81	242·63	Westby Monarch (5404)
Claremont Blossom 50th	Junior 4 years	6-3-50	273	16	6,903	3·33	229·82	Capel Monarch (7898)
Claremont Maggie Morrison 74th	Senior 3 years	1-11-49	273	25	8,055	3·54	285·07	Westby Masterpiece (5403)
Claremont Cherry 49th	Senior 3 years	28-10-49	273	14	6,822	3·85	262·66	Westby Masterpiece (5403)
Claremont Treasure 52nd	Senior 3 years	27-12-49	273	27	7,476	3·35	250·80	Westby Masterpiece (5403)
Claremont Star 39th	Senior 3 years	22-4-50	273	16	7,353	3·39	249·61	Wooroloo Night Fighter (8884)
Claremont Mabel 36th	Senior 3 years	14-11-49	273	22	7,221	3·42	247·05	Westby Monarch (5404)
Claremont Flora 17th	Senior 3 years	18-2-50	273	17	7,206	3·40	245·09	Capel Monarch (7898)
Claremont Pinafore 22nd	Senior 3 years	2-3-50	273	15	7,155	3·29	235·19	Capel Monarch (7898)
Claremont Treasure 55th	Senior 3 years	29-3-50	273	19	6,747	3·39	228·92	Westby Masterpiece (5403)
Claremont Maggie Morrison 80th	Junior 3 years	27-10-49	273	17	6,366	3·55	225·90	Glanavon Dunster (6867)
Claremont Beauty 35th	Junior 3 years	4-5-50	273	19·5	6,883	3·38	232·68	Glanavon Dunster (6867)
Claremont Beauty 34th	Junior 3 years	26-11-49	273	22	7,281	3·16	230·27	Westby Masterpiece (5403)
Claremont Whitby Maid 69th	Junior 3 years	12-5-50	60	37	2,220	3·40	75·57	Glanavon Dunster (6867)
Claremont Beauty 37th	Senior 2 years	2-6-50	273	19	5,862	3·77	221·58	Westby Masterpiece (5403)
Claremont Cherry 58th	Senior 2 years	25-6-50	273	15·5	5,591	3·75	209·70	Claremont Bravado (9176)
Claremont Pinafore 24th	Senior 2 years	13-12-49	240	22	5,625	3·59	202·02	Westby Monarch (5404)
Claremont Beauty 39th	Junior 2 years	4-6-50	273	20·5	7,831	3·50	274·18	Glanavon Gulliver (10589)
Claremont Belle 54th	Junior 2 years	26-11-49	273	23	6,579	3·99	262·30	Wooroloo Night Fighter (8884)
Claremont Treasure 58th	Junior 2 years	27-11-49	273	24	6,657	3·55	236·87	Westby Masterpiece (5403)
Claremont Treasure 61st	Junior 2 years	11-6-50	273	19	6,357	3·66	233·03	Claremont Bennie (9170)
Claremont Poppy 54th	Junior 2 years	18-7-50	273	13·5	5,725	3·91	224·26	Claremont Bennie (9170)
Claremont Dover 16th	Junior 2 years	29-12-49	273	22	6,486	3·45	223·70	Claremont Charles (9187)
Claremont Biddy 99th	Junior 2 years	21-6-50	273	12	5,602	3·96	221·89	Claremont Bennie (9170)
Claremont Mabel 44th	Junior 2 years	25-11-49	273	21	6,498	3·40	221·06	Claremont Charles (9187)
Claremont Biddy 95th	Junior 2 years	24-10-49	273	22	6,336	3·37	213·57	Westby Monarch (5404)
Claremont Cherry 56th	Junior 2 years	11-12-49	273	20	5,660	3·73	211·16	Wooroloo Night Fighter (8884)
Claremont Cherry 60th	Junior 2 years	26-6-50	273	17	5,406	3·75	203·02	Claremont Baronet (7942)
Claremont Belle 53rd	Junior 2 years	8-10-49	273	18	4,884	3·75	183·63	Westby Monarch (5404)
Claremont Whitby Maid 72nd	Junior 2 years	20-6-50	273	14	5,712	3·10	177·36	Glanavon Gulliver (10589)
Claremont Poppy 50th	Junior 2 years	24-11-49	273	13	4,899	3·61	177·22	Westby Masterpiece (5403)
Claremont Pinafore 25th	Junior 2 years	7-6-50	273	14	4,842	3·65	176·83	Claremont Bennie (9170)
Claremont Clarrie 8th	Junior 2 years	19-10-49	273	14	4,917	3·39	166·61	Wooroloo Night Fighter (8884)
Claremont Treasure 60th	Junior 2 years	21-7-50	273	10	4,395	3·47	152·89	Claremont Charles (9187)
Claremont Blossom 58th (Died)	Junior 2 years	16-7-50	210	11	3,855	3·88	139·65	Claremont Bravado (9176)
Claremont Blossom 37th	Junior 2 years	13-7-50	150	10	2,580	3·62	93·39	Claremont Charles (9187)
Claremont Cherry 64th	Junior 2 years	27-10-50	30	13	390	4·35	16·98	Glanavon Gulliver (10589)

Number of Cows in Average, 78. Average Milk, 7,054 lb. Average Test, 3·48 per cent. Average Butterfat, 245·85 lb.

WOOROLOO SANITORIUM FARM

Wooroloo Doreen 5th	Mature	4–8–50	273	14	8,577	4·28	366·90	Berry Rufus 2nd (6570)
Wooroloo Lulu	Mature	6–7–50	273	4	7,557	4·12	311·11	Wooroloo Red Baron (6412)
Wooroloo Trinket	Mature	26–1–50	240	6·5	5,490	4·32	237·24	Wooroloo Red Baron (6412)
Wooroloo Lorna	Mature	8–12–49	273	12	5,316	3·97	211·24	Wooroloo Red Baron (6412)
Wooroloo Golden Dawn	Mature	23–11–49	210	6	4,560	4·28	195·45	Berry Rufus 2nd (6570)
Wooroloo Claret	Mature	4–6 50	240	6·5	4,845	3·78	183·05	Berry Rufus 2nd (6570)
Claremont Cherry 35th	Mature	26 11–49	240	7	4,140	3·98	164·91	Glanavon Dunster (6867)
Wooroloo Shirley 2nd	Mature	30–7–50	120	11·5	3,120	3·76	117·51	Wooroloo Red Baron (6412)
Wooroloo Jessie	Mature	15–6–50	90	30	3,120	3·69	115·26	Berry Rufus 2nd (6570)
Wooroloo Petunia	Senior 4 years	19–11–49	240	13	6,300	4·06	256·16	Berry Rufus 2nd (6570)
Wooroloo Gleam	Senior 4 years	20–2–45	210	8	3,345	4·01	134·16	Glanavon Fusilier (8106)
Wooroloo Grace	Junior 4 years	17–12–49	273	5·5	5,341	4·17	222·96	Glanavon Fusilier (8106)
Claremont Maggie Morrison 73rd	Junior 4 years	17 11–49	240	9	4,890	3·99	195·24	Capel Monarch (7898)
Wooroloo Bonnie Mary	Junior 4 years	30–3–50	180	16·5	4,380	4·27	187·05	Glanavon Fusilier (8106)
Wooroloo Waratah	Junior 4 years	27–3–50	150	21·5	4,215	4·11	173·40	Glanavon Fusilier (8106)
Wooroloo Red Glow	Junior 4 years	14–3–50	180	12	3,570	3·80	135·99	Glanavon Fusilier (8106)
Wooroloo Winsome	Junior 4 years	17–6–50	150	10	3,780	3·51	132·80	Glanavon Fusilier (8106)
Wooroloo Ailsa	Junior 4 years	31–8–50	180	10	4,005	2·74	109·92	Wooroloo Baron's Reward (8870)
Wooroloo Laureen	Senior 3 years	24 12–49	273	19·5	8,293	4·33	359·41	Glanavon Fusilier (8106)
Wooroloo Millie	Junior 3 years	29–12–49	273	28·5	9,295	4·18	388·50	Glanavon Fusilier (8106)
Wooroloo Doreen 8th	Junior 3 years	6–11–49	273	10	6,810	4·42	301·33	Glanavon Fusilier (8106)
Wooroloo Twinkle	Junior 3 years	24–11–49	240	8	5,570	4·12	229·53	Wooroloo Morning Star (8882)
Wooroloo Patsy 5th	Junior 3 years	21–9–50	150	24	5,040	3·56	179·47	Parkview Elect (9774)
Wooroloo Garbo	Junior 3 years	19 12–49	210	6	2,790	3·98	111·03	Glanavon Fusilier (8106)
Wooroloo Glamour	Senior 2 years	15 8–50	180	8	4,410	3·47	153·12	Parkview Elect (9774)
Wooroloo Helen	Junior 2 years	26–10–49	273	35	10,125	4·02	407·52	Parkview Elect (9774)
Wooroloo Pretty Maid	Junior 2 years	1–6–50	273	14·5	8,968	3·79	339·97	Parkview Elect (9774)
Wooroloo Sequin	Junior 2 years	6–6–50	273	11·5	7,689	4·14	318·12	Parkview Elect (9774)
Wooroloo Hester	Junior 2 years	9–4–50	273	17·5	8,122	3·88	315·17	Parkview Elect (9774)
Wooroloo Red Flower 2nd	Junior 2 years	28–2 50	273	22·5	7,447	4·01	299·18	Parkview Elect (9774)
Wooroloo Baron's May	Junior 2 years	8–3–50	273	15·5	7,126	4·05	288·52	Wooroloo Red Baron (6412)
Claremont Zena	Junior 2 years	25–2–50	273	19·5	6,733	4·12	277·81	Westby Monarch (5404)
Wooroloo Baron's Betty	Junior 2 years	27–1–50	273	15	6,765	3·89	263·61	Wooroloo Red Baron (6412)
Wooroloo White Heather	Junior 2 years	21 10 49	273	12	6,156	4·28	263·38	Parkview Elect (9774)
Wooroloo Juno 2nd	Junior 2 years	19–5–50	273	7	6,151	4·15	255·23	Parkview Elect (9774)
Wooroloo Veronica	Junior 2 years	8–3–50	273	20	6,840	3·69	252·52	Parkview Elect (9774)
Wooroloo Anne	Junior 2 years	21 10–49	273	13	5,649	4·46	252·49	Parkview Elect (9774)
Wooroloo Baron's Camelia	Junior 2 years	1–3–50	273	15·5	6,121	4·12	252·07	Wooroloo Red Baron (6412)
Wooroloo Baron's Lady	Junior 2 years	27–3–50	273	13·5	6,040	4·08	246·34	Wooroloo Red Baron (6412)
Wooroloo Baron's Lilac	Junior 2 years	8–1–50	273	15·5	6,106	4·01	244·99	Wooroloo Red Baron (6412)
Wooroloo Millie 2nd	Junior 2 years	6 2 50	273	16·5	6,124	3·89	238·61	Parkview Elect (9774)
Wooroloo Wattle	Junior 2 years	8–3–50	273	11	6,213	3·70	230·21	Parkview Elect (9774)
Wooroloo Saphire 4th	Junior 2 years	31–3–50	273	3	5,514	4·09	225·97	Parkview Elect (9774)
Wooroloo Viola	Junior 2 years	7–5–50	240	5·5	4,710	4·70	221·67	Wooroloo Baron Dundee (10108)
Wooroloo Lady Jane	Junior 2 years	7–3 50	273	10	5,475	3·97	217·49	Parkview Elect (9774)
Wooroloo Baron's Iris	Junior 2 years	1–4–50	273	10·5	5,251	3·92	205·79	Wooroloo Red Baron (6412)
Wooroloo Roselyn	Junior 2 years	7–3 50	273	11·5	5,404	3·72	201·19	Parkview Elect (9774)
Wooroloo Sandra	Junior 2 years	26 2–50	273	9·5	4,123	4·14	170·71	Glanavon Fusilier (8106)
Wooroloo Baron's Fairy	Junior 2 years	12–10–50	90	25·5	2,550	3·99	101·79	Wooroloo Red Baron (6412)
Wooroloo Baby	Junior 2 years	15–10–50	120	10	2,025	3·66	74·22	Parkview Elect (9774)

Number of Cows in Average, 46. Average Milk, 6,035 lb. Average Test, 4·02 per cent. Average Butterfat, 242·63 lb.

PURE BRED HERD TESTING—continued.

COWS WHICH COMPLETED TEST DURING THE SEASON ENDED 30TH APRIL, 1951—*continued.*

AUSTRALIAN ILLAWARRA SHORTHORNS.

Name of Cow.	Age Class.	Date of Entry to Test.	No. of Days in Test.	Weight of Milk on Last Day of Test. lb.	Weight of Milk for Period. lb.	Average Test. %	Weight of Butterfat for Period. lb.	Sire.
NARROGIN SCHOOL OF AGRICULTURE.								
Narrogin Dixie	Mature	23-4-50	240	4·5	6,270	4·60	288·21	Tipperary Amy's Mascot (6338)
Narrogin Daisybell	Mature	9-2-50	240	7·5	6,225	4·22	262·68	Westby Masterpiece (5403)
Narrogin Duchess	Mature	18-7-50	60	25·5	1,680	4·00	67·26	Tipperary Amy's Mascot (6338)
Narrogin Collette	Senior 4 years	15-10-49	273	40	11,820	4·74	560·85	Tipperary Amy's Mascot (6338)
Narrogin Mary	Senior 4 years	20-3-50	240	11	6,300	3·92	246·69	Tipperary Amy's Mascot (6338)
Narrogin Mignon	Senior 4 years	23-3-50	273	12·5	5,707	4·12	235·03	Tipperary Amy's Mascot (6338)
Narrogin Mayflower	Junior 4 years	3-5-50	240	8	5,805	4·83	280·47	Wooroloo Gay Gordon (8878)
Narrogin Sybil	Senior 3 years	5-2-50	273	9	5,892	4·33	255·12	Wooroloo Gay Gordon (8878)
Narrogin Mignonnette	Senior 3 years	13-2-50	273	15·5	5,806	4·00	232·55	Wooroloo Gay Gordon (8878)
Narrogin Lady	Senior 3 years	10-4-50	240	9·5	4,665	4·20	195·90	Wooroloo Gay Gordon (8778)
Narrogin Cora	Senior 3 years	28-1-50	180	10	3,540	4·64	164·22	Wooroloo Gay Gordon (8878)
Narrogin Coquette	Senior 3 years	6-1-50	210	6	3,210	4·55	146·01	Wooroloo Gay Gordon (8878)
Narrogin Laurel	Junior 3 years	10-7-50	273	7	7,476	4·51	337·48	Wooroloo Gay Gordon (8878)
Narrogin Gay Doll	Junior 3 years	12-5-50	273	7	5,001	4·80	240·52	Wooroloo Gay Gordon (8878)
Narrogin Lillith	Junior 3 years	24-7-50	273	8	5,034	4·61	232·27	Wooroloo Gay Gordon (8878)
Narrogin Clarissa	Junior 3 years	15-7-50	273	5	6,626	3·50	218·63	Wooroloo Gay Gordon (8878)
Narrogin Dark Charm	Junior 3 years	1-6-50	210	11·5	3,615	4·22	152·64	Wooroloo Gay Gordon (8878)
Narrogin Marina	Junior 3 years	15-5-50	120	13·5	1,770	4·29	75·93	Wooroloo Gay Gordon (8878)
Narrogin Jewel	Junior 3 years	29-5-50	90	10	1,060	4·74	73·98	Wooroloo Gay Gordon (8878)
Narrogin Marie	Senior 2 years	19-8-50	210	3·5	3,135	4·30	134·85	Wooroloo Gay Gordon (8878)
Narrogin Jeanne	Junior 2 years	2-3-50	273	19	6,282	3·86	242·42	Wooroloo Gay Gordon (8878)
Narrogin Gay Flower	Junior 2 years	19-8-50	210	7·5	3,540	3·73	132·27	Wooroloo Gay Gordon (8878)
Narrogin Dulcie	Junior 2 years	21-8-50	120	8	1,620	5·11	82·80	Wooroloo Gay Gordon (8878)
Number of Cows in Average, 19. Average Milk, 5,576 lb. Average Test, 4·30 per cent. Average Butterfat, 239·94 lb.								
D. A. & I. L. LINDBERG.								
Westlawn Patricia	Mature	28-6-50	273	12	7,491	4·12	308·50	Valliere Patrico (5363)
Westlawn Melba	Mature	27-9-50	180	9	6,390	3·70	236·76	Glanavon Pilot (5747)
Westlawn Fussy	Mature	6-8-50	210	6	6,420	3·52	226·20	Glanavon Pilot (5747)
Wooroloo Lena	Senior 4 years	18-3-50	273	11	4,413	3·35	147·72	Glanavon Fusilier (8106)
Westlawn Dawn	Senior 3 years	1-4-50	273	6	5,148	3·83	197·47	Glanavon Pilot (5747)
Westlawn Flower	Senior 3 years	8-4-50	273	13	4,464	3·63	162·28	Glanavon Pilot (5747)
Westlawn Myrtle	Senior 2 years	13-7-50	240	5	5,190	5·91	203·16	Wooroloo Viking (10120)
Westlawn Fuschia	Senior 2 years	14-4-50	273	12	4,221	3·91	165·02	Wooroloo Viking (10120)
Number of Cows in Average, 8. Average Milk, 5,467 lb. Average Test, 3·76 per cent. Average Butterfat, 205·88 lb.								

J. WHITE.

Brookview Roany	Mature	10–8–50	180	16	6,300	3·74	235·74	Basildene Lad 2nd (6510)
Capel Blue Pansy 2nd	Mature	16–5–50	273	11·5	5,745	3·82	219·51	Capel Star King (4672)
Valliere Eleanor 2nd	Senior 4 years	8–5–50	273	13	6,429	4·20	270·50	Valliere Archer (8811)
Capel Joan 2nd	Senior 4 years	23–6–50	210	13	5,040	3·65	184·23	Capel Dove King (5579)
Brookview Evan's Connie	Junior 4 years	23–6–50	210	15	5,400	4·02	217·14	Glanavon Evan (5740)
Capel Roan Queen 2nd	Senior 3 years	1–4–50	273	22	5,976	3·31	198·08	Capel Dove King (5579)
Brookview Evan's Veronica	Senior 3 years	25–9–50	150	13	4,830	3·80	183·63	Glanavon Evans (5740)
Capel Model 12th	Junior 3 years	10–5–50	240	13	4,110	3·75	154·08	Capel Rose's General (7901)
Brookview Evans Cherry	Senior 2 years	28–5–50	240	8	4,230	3·90	165·12	Glanavon Evan (5740)
Capel Eleanor 3rd	Junior 2 years	24–5–50	240	17	5,460	3·54	193·22	Capel Star King (4672)
Brookview Homers Crocus	Junior 2 years	19–8–50	150	16	3,810	4·37	166·56	Carbunup Homer (9141)
Capel Queen's Twinkle	Junior 2 years	22–6–50	210	15	3,990	4·05	161·43	Capel Fairy's Triumph (9133)
Brookview Homers Viviene	Junior 2 years	31–8–50	180	9	3,780	3·93	148·80	Carbunup Homer (9141)

Number of Cows in Average, 13. Average Milk, 5,008 lb. Average Test, 3·78 per cent. Average Butterfat, 192·16 lb.

FRIESIANS.

L. A. JACKMAN.

Seven Hills Alcartra Joanna	Mature	7–8–50	120	24·5	3,420	3·18	108·78	Anama Alcartra Viljoen
Dandala Alcartra Deanna	Senior 4 years	1–5–50	273	28	14,064	2·69	378·40	Greenfields Laddie
Dandala Alcartra Diadem	Junior 4 years	22–5–50	120	19·5	3,330	3·33	110·82	Greenfields Laddie
Dandala Lady Dainty	Junior 2 years	2–8–50	120	15	3,135	2·98	93·57	Dandala Alcartra Laddie

Number of Cows in Average, 1. Average Milk, 14,064 lb. Average Test, 2·69 per cent. Average Butterfat, 378·40 lb.

J. G. MONEY.

Murray Glen Princess Avonne	Mature	25–4–50	273	17	11,526	3·50	403·39	Murray Glen Griselda Beets (1495)
Tranmere Twinkletoes	Mature	5 4–50	273	25·5	13,606	2·82	384·21	Cleeve Echo Triumph
Seven Hills Alcartra Janice	Mature	19–6–50	273	16	12,273	3·11	382·08	Anama Alcartra Viljoen
Seven Hills Alcartra Alberta	Mature	2–8–50	273	12·5	10,552	3·40	358·84	Anama Alcartra Viljoen
Seven Hills Alcartra Dorinda	Mature	28–7–50	273	19·5	10,833	3·16	342·66	Anama Alcartra Viljoen
Seven Hills Alcartra Fay	Senior 4 years	14–6–50	273	14·5	10,858	2·84	308·27	Anama Alcartra Viljoen
Seven Hills Alcartra Tulip 2nd	Junior 3 years	8–8–50	210	9·5	6,180	4·23	261·75	Anama Alcartra Viljoen
Seven Hills Transvaal Jacintha	Junior 2 years	27–4 50	273	26	10,683	3·39	362·07	Murray Glen Transvaal Field Marshall
Seven Hills Transvaal Judith	Junior 2 years	21–4–50	273	22	9,651	3·69	356·38	Murray Glen Transvaal Field Marshall
Seven Hills Transvaal Patricia	Junior 2 years	7–7–50	273	16·5	8,899	3·35	297·79	Murray Glen Transvaal Field Marshall
Seven Hills Transvaal Thea	Junior 2 years	28–7–50	273	18	7,914	3·66	289·84	Murray Glen Transvaal Field Marshall
Seven Hills Alcartra Joy	Senior 2 years	19–7–50	273	8	8,319	2·83	235·78	Anama Alcartra Viljoen

Number of Cows in Average, 12. Average Milk, 10,941 lb. Average Test, 3·03 per cent. Average Butterfat, 331·92 lb.

A. W. CUNNINGHAM.

Glencairn Delma	Mature	17–9–50	210	28·5	10,200	4·18	426·05	Seven Hills King Dominion
Glencairn Peggy	Mature	8–6–50	273	23·5	10,885	3·77	409·95	Cadalelup Posch
Glencairn Bonnie	Mature	5–6–50	240	9·5	10,500	3·88	407·70	Seven Hills King Dominion
Glencairn Dot	Mature	10–9–50	240	18·5	10,980	3·27	395·01	Seven Hills King Dominion
Glencairn Dido	Mature	26–3–50	240	21	10,560	3·74	394·68	Cadalelup Posch
Glencairn Queen	Mature	9–5–50	273	19	10,317	3·66	377·46	Seven Hills King Dominion
Glencairn Nuisance	Mature	17–6 50	273	13	9,249	4·07	376·04	Cadalelup Posch
Glencairn Rat	Mature	15–9–50	210	26	8,803	4·26	374·67	Cadalelup Posch
Somerby Flo	Mature	22 3–50	273	25	10,245	3·32	340·36	Somerby 140 (2238)
Somerby Diligent	Mature	29–5–50	273	12·5	8,992	3·73	335·49	Somerby 140 (2238)
Glencairn Lizzie	Mature	28–10·50	180	29·5	7,590	4·41	334·91	Cadalelup Posch
Glencairn Bloss	Mature	3–11–50	180	31·5	8,535	3·34	285·15	Seven Hills King Dominion
Glencairn Midget	Mature	7–11–50	180	29·5	7,260	3·82	277·17	Cadalelup Posch
Glencairn Rosie	Mature	12–12–50	120	34·5	5,625	4·21	236·87	Cadalelup Posch

PURE BRED HERD TESTING—continued.

COWS WHICH COMPLETED TEST DURING THE SEASON ENDED 30TH APRIL, 1951—*continued.*

FRIESIANS.

Name of Cow.	Age Class.	Date of Entry to Test.	No. of Days in Test.	Weight of Milk on Last Day of Test.	Weight of Milk for Period.	Average Test.	Weight of Butterfat for Period.	Sire.
				lb.	lb.	%	lb.	
A. W. CUNNINGHAM—continued.								
Glencairn Dido	Mature	10–1–51	120	39·5	5,505	4·02	221·58	Cadalelup Posch
Glencairn Connie	Mature	5–1–51	120	36·5	5,115	4·23	212·78	Seven Hills King Dominion
Glencairn Dynamite	Mature	7–1–51	120	35	4,740	3·96	187·65	Cadalelup Posch
Glencairn Dulcie	Mature	25–12 50	120	39·5	5,610	3·30	184·95	Seven Hills King Dominion
Glencairn Petal	Mature	28–8–50	90	46·5	4,395	3·65	160·29	Seven Hills King Dominion
Glencairn Bubs	Mature	3–2–51	90	39·5	4,080	3·89	158·73	Cadalelup Posch
Glencairn Blossom	Mature	29–1–51	90	37	3,720	3·65	136·02	Cadalelup Posch
Glencairn Curlie	Mature	7–2–51	60	40·5	2,655	4·16	110·46	Cadalelup Posch
Glencairn Sylvia	Mature	1–3–51	60	48·5	2,880	3·76	108·21	Cadalelup Posch
Glencairn Bubs	Senior 4 years	30 3–50	240	20·5	10,650	3·57	380·58	Cadalelup Posch
Glencairn Blossom	Senior 4 years	20 3 50	273	21	9,498	3·63	345·11	Cadalelup Posch
Cadalelup Nymph's Snowball	Senior 3 years	31–8–50	240	14·5	4,320	4·18	180·75	Cadalelup Victor
Cadalelup Systems Flora	Senior 3 years	30–9 50	210	20	5,190	3·33	172·83	Cadalelup Victor
Cadalelup Donna's Joan	Senior 3 years	6–2–51	90	36	3,360	3·33	112·14	Cadalelup Victor
Glencairn Tunis	Junior 3 years	7–11–50	180	31·5	7,905	3·38	267·69	Cadalelup Posch
Glencairn Billy	Junior 3 years	21–11–50	150	26·5	5,715	2·98	170·46	Cadalelup Posch
Cadalelup Verna	Junior 3 years	9–2–51	60	36	2,370	3·52	83·37	Etterick Clive
Cadalalup Ash Queen	Junior 3 years	9–2–51	60	32·5	2,235	3·37	75·36	Etterick Clive
Glencairn Julienne	Senior 2 years	11–11–50	180	28·5	6,660	3·44	229·20	Murray Glen Ashlyn Paxton (2173)
Cadalelup Faynes Surprise	Senior 2 years	4–1–51	120	34	4,470	3·55	158·67	Victoria Primer
Glencairn Dina	Junior 2 years	3–9–50	240	17	7,560	3·90	295·05	Murray Glen Ashlyn Paxton (2173)
Cadalelup Privett's Perfect	Junior 2 years	24–3–50	273	18	6,660	3·85	257·15	Cadalelup Victor
Glencairn Dilashlyn	Junior 2 years	11–9–50	210	21	6,910	3·51	242·58	Murray Glen Ashlyn Paxton (2173)
Glencairn Florrie	Junior 2 years	21–10–50	180	19·5	5,780	3·82	220·83	Murray Glen Ashlyn Paxton (2173)
Cadalelup Ladybird	Junior 2 years	2–1–51	120	30	4,050	3·63	147·06	Cadalelup Victor
Cadalelup Reenees Dainty	Junior 2 years	3–1–51	120	31	3,525	3·08	108·63	Etterick Clive
Cadalelup Privett's Perfect	Junior 2 years	9–2 51	60	23·5	1,395	3·80	52·98	Cadalelup Victor
Number of Cows in Average, 24.	Average Milk, 7,957 lb.			Average Test, 3·92 per cent.			Average Butterfat, 312·36 lb.	
F. BYRD.								
Cleeve Avon Queenie	Mature	6–7–50	273	22·5	10,627	4·29	455·80	Murray Glen Lord Avon (1696)
Cleeve Avon Maureen	Mature	5–6 50	273	8·5	9,970	3·28	327·37	Murray Glen Lord Avon (1696)
Cleeve Avon Nannette	Mature	21 4 50	273	29	8,112	3·90	316·35	Murray Glen Lord Avon (1696)
Cleeve Avon Beauty	Mature	26 1–50	240	8	5,850	4·08	238·68	Murray Glen Lord Avon (1696)
Cleeve Cobber Sylvia	Mature	25–2–50	273	13	4,314	3·38	145·89	Cleeve Avon Cobber (2082)
Cleeve Avon Joan	Mature	19–2–50	210	6	2,865	3·41	97·65	Murray Glen Lord Avon (1696)
Cleeve Cobber Marlene	Senior 4 years	1–7–50	273	20·5	8,986	4·35	300·86	Cleeve Avon Cobber (2082)
Murray Glen Auklod Butterfly	Junior 3 years	11 4–50	273	13	5,469	3·76	205·69	Anama Auklod Fieldmarshall (2018)
Ambergate Della	Junior 2 years	3–3–50	273	27	7,236	3·51	253·73	Greenfields Lennie
Cleeve Cobber Countess	Junior 2 years	13–4–50	273	21	5,913	4·03	238·19	Cleeve Avon Cobber (2082)
Cleeve Bernie Joyce	Junior 2 years	15–4–50	273	14	4,947	3·99	197·70	Cleeve Avon Bernie (2081)
Number of Cows in Average, 11.	Average Milk, 6,754 lb.			Average Test, 3·73 per cent.			Average Butterfat, 252·53 lb.	

"Westralia"—A New Rust Resistant Pole Bean

W. P. CASS SMITH, Government Plant Pathologist.

H. L. HARVEY, Senior Plant Pathologist.

OLGA M. GOSS, Plant Pathologist.

"Westralia" is a rust-resistant pole bean which has been developed from a natural cross between the popular but rust-susceptible Golden Harvest variety and a rust resistant strain of brown-seeded Kentucky Wonder. It possesses the main desirable characters of both parents, is white seeded, high yielding, and is suitable both as a "fresh" bean and for canning purposes.

Of the diseases attacking commercial bean crops in Western Australia, bean rust caused by the fungus *Uromyces appendiculatus (Pers) Fr.* is undoubtedly the most serious.

The disease was first recorded in this State in 1943, in districts adjacent to Perth (1), and subsequently spread rapidly to all commercial bean growing areas.

It now occurs yearly and may develop in any planting, but usually it increases in severity towards the end of the growing season, and in the main bean growing areas, is most damaging in late crops harvested from February onwards.

The disease may attack any above ground part, but causes most injury by leaf infections which, if numerous, lead to complete defoliation.

The popular Golden Harvest pole bean variety (Syn. Prolific, Abundance, Summer Glory), which comprises the bulk of commercial plantings, has proved to be very susceptible (see Fig. 1), whereas dwarf beans, which command lower market prices and are grown to a very limited extent only, have in the past been less seriously affected.

In late crops of Golden Harvest, bean rust often reaches epidemic proportions and causes total crop failure, resulting in market shortages, and higher prices to the consumer public. In addition to its direct effect on yield, the disease has also brought about a reduction in the acreage planted to late crops because of the high rust hazard.

Varietal Rust Resistance Tests.

Although losses from bean rust may be reduced by frequent applications of sulphur containing fungicides, this method of control is costly and generally impracticable in Western Australia where the majority of bean crops are watered by overhead sprinklers.

Undoubtedly the best method of combating the disease is by growing resistant varieties, and with this object in view, a number of reputedly rust resistant varieties were introduced from America and

Fig. 1.

Leaf of Golden Harvest (top) and Westralia (bottom) showing respectively, marked susceptibility and high resistance to rust. These leaves were from adjacent rows in a crop at Spearwood.

Bean rust first appears in the form of circular yellow spots which soon become raised and finally rupture, exposing the velvety, reddish-brown spore masses of the fungus.

Photo by Govt. Photographer.

elsewhere, in 1944, 1945, 1946 and tested under local conditions. In the absence of glasshouse facilities all rust resistance tests were carried out in the field, mainly on the property of Mr. Roy Schultze at Balcatta, where liability to rust in autumn is high.

In each year the trials commenced in late February or early March. The test varieties were planted between rows of the susceptible Golden Harvest variety, and when necessary, bean rust inoculum was sprayed on the young foliage to induce early infection and rapid multiplication of the disease to epidemic amounts.

The rust reactions of the varieties were tested very thoroughly by this means.

A list of the introduced varieties, their origin, and local rust reaction is shown in the table below.

TABLE OF VARIETAL REACTIONS TO BEAN RUST.

Year of Test.	Variety.	Rust Reaction.	Origin of Seed.
1944	Black Valentine (Dwarf)	Susceptible	Dr. Knott, California Agr. Expt. Station, U.S.A.
,,	Blue Lake	,,	,,
,,	White-seeded Kentucky Wonder	Very susceptible	,,
1945	Brown-seeded Kentucky Wonder	Resistant	Associated Seed Growers Inc., New-haven, Conn., U.S.A.
,,	White-seeded Kentucky Wonder	Very susceptible	,,
,,	Stringless Black Creaseback	Very susceptible	Rogers Bros. Seed Co. Inc., Idaho U.S.A.
,,	Brown-seeded Kentucky Wonder	,,	,,
,,	Logan (Dwarf)	Susceptible	C.S.I.R.O., Canberra.
,,	Florida Belle (Dwarf)	Very susceptible	,,
,,	Harters, 765	Resistant	Prof. W. L. Waterhouse, Sydney University.
,,	,, 780	Very resistant	,,
,,	,, 814	,,	,,
,,	Alabama 1 Blackpole	Susceptible	Prof. C. L. Isbell, Alabama Agr. Expt. Station, U.S.A.
,,	Morse No. 191	Very susceptible	Ferry-Morse Seed Co., California, U.S.A.
,,	Brown-seeded Rust Resistant Kentucky Wonder	Very resistant	,,
1946	Potomac (Black-seeded)	Susceptible	Associated Seed Growers Inc., New-haven, Conn., U.S.A.
,,	Decatur (White-seeded)	Very susceptible	,,

N.B.—Unless otherwise stated, the varieties listed are Pole Bean types.

Races of Bean Rust.

The bean rust parasite comprises a number of races which may vary both in distribution and in the varieties they attack.

For this reason bean varieties which are resistant to rust in one locality or country, do not necessarily maintain their resistance when grown elsewhere. This point is very well illustrated by reference to the table above, which shows that several of the introduced rust resistant varieties, and particularly some of the Kentucky Wonder strains, showed marked susceptibility in Western Australia. It follows therefore that varieties which are to be used as resistant parents for cross breeding work should be widely tested against all races to which the hybrid progeny will later be exposed. The identification of bean rust races from Western Australia is undertaken by Professor W. L. Waterhouse and colleagues at Sydney University. From bean rust

material forwarded, Professor Waterhouse identified only two races between the years 1943 and 1949, namely r. 2 and r. 17, but in 1950 a third race was identified for the first time. This race appears to be rapidly superseding the two older ones and it is identical with a race which has recently appeared in New South Wales and which is capable of attacking a number of hitherto resistant "dwarf" varieties, including Hawkesbury Wonder, Brown Beauty, Tweed Wonder, etc. (2).

Fig. 2

Hybrid bean trial, autumn 1948, at Mr. Schultze's market garden, Balcatta. Control rows of the susceptible Golden Harvest variety were planted between the hybrids and sprayed with rust inoculum to encourage a build-up of the disease, and thoroughly test the rust reactions of the hybrid plants. Rigorous selection for high rust resistance and other desirable characters was made.

—Photo by Govt. Photographer.

Field Trials with the Ferry-Morse Brown Kentucky Wonder Strain (P4457).

Of the "very resistant" varieties listed in the table, the brown seeded Kentucky Wonder pole bean strain from the Ferry Morse Seed Co., although not wholly satisfactory commercially, possessed the best agronomic qualities. In view of the urgency of maximum food production at that wartime period, it was decided to bulk this variety with the hope that it would relieve the bean rust problem at least until superior varieties could be obtained.

Seeds were collected therefore, from the most resistant plants and bulked in a crop planted in early summer 1945, at Messrs. B. & J. Arbuckle's property, Balcatta. In autumn 1946, free samples of this bulked seed were distributed (as P4457, the W.A. Department of Agriculture Accession number) to growers in many different localities, on

condition that the performance of the variety was subsequently reported. Similar trials were also conducted during the autumn of 1947.

As a result of these comprehensive trials throughout the State, extending from Albany in the south to Carnarvon in the North, the high rust resistance of the variety in all test localities was confirmed, often under epidemic conditions, which ruined the yield of adjacent crops of Golden Harvest.

Agronomically however, the variety had certain undesirable features. Although a fairly heavy yielder, of good stringless quality, the pods were short and curled, and the abundant foliage made picking very difficult.

Despite these disadvantages, a number of growers in rust-liable areas continued to use the variety for late planting as it had proved such a reliable cropper under epidemic conditions.

Development of the "Westralia" Variety.

During the summer months of 1945 and 1946, crosses were attempted between Golden Harvest and the Ferry Morse strain of brown seeded Kentucky Wonder, with the object of combining the good qualities of both in a new variety. Unfortunately, these attempts were unsuccessful.

It was noted however during early field trials that the latter variety produced a few white seeded segregates, indicating either that it had not been "pure lined," or, that it had crossed naturally with Golden Harvest.

Plants grown from these white seeds included a few which were highly resistant to rust, but agronomically they were undesirable and they were mostly infected with mosaic. To further explore the possible occurrence of natural crossing, selected mosaic-free seed of Golden Harvest was planted between rows of the brown seeded Kentucky Wonder by Mr. J. Arbuckle at Balcatta. The seeds obtained from these Golden Harvest plants were grown at Mr. Schultze's property in autumn, 1947, and yielded seven natural hybrids (approximately 2%), which were detected by their high rust resistance and brown seed colour. The occurrence of natural crossing was demonstrated by this method during the following year also.

The seeds produced by these seven natural hybrids were subsequently planted as single lines, when segregation for seed colour, rust reaction and growth habit occurred. Rigorous selection was practised with the object of evolving a new plant type possessing the high rust resistance and stringless pod quality of the Kentucky Wonder parent, combined with the desirable characters of Golden Harvest, particularly white seed colour (which is important for canning purposes), straight, plump and long pod type, heavy yield, early maturity and sparser foliage. (See Fig. 2.) Selection was also made against other diseases which appeared occasionally, including mosaic, anthracnose and bacterial blight.

Field selection was continued through five crop generations during which thousands of hybrid plants were carefully inspected, and all but the few of desirable type were gradually eliminated. (See Fig. 3.)

Fig. 3

Desirable type of hybrid plant with large, well separated leaves (making for ease of picking), heavy yield of long plump pods of good shape. Each plant was trained to a single pole to facilitate inspection and selection work.

—Photo by Govt. Photographer.

In the sixth generation, yield trials were conducted with these superior plant units at Carnarvon Research Station in late winter, 1950*, and at Balcatta in summer of the same year. At Carnarvon, where rust was very prevalent, the hybrid plants were unaffected, whereas control rows of Golden Harvest were severely damaged; and at Balcatta in the absence of the disease, the hybrid plant yields were comparable with that of Golden Harvest.

Subsequently seeds of the best plant unit were bulked and the name "Westralia" was given to this new variety to indicate its local origin. (See Fig. 4.)

The first seed release of "Westralia" was made in February 1951, and owing to limited stocks, rationing was adopted to enable as many growers as possible to test the new variety.

* In northern areas such as Carnarvon and Geraldton where higher winter temperatures prevail, beans are grown during winter and spring. In the main bean growing areas, which are farther south, the season extends from about September until the end of June.

Numerous reports were subsequently received from growers indicating that "Westralia" had fully come up to expectations and that it had remained rust-free and yielded well, whereas crops of Golden Harvest nearby were so severely damaged by rust that reduced yields or crop failure resulted. (See Fig. 1.) The high rust resistance of "Westralia" and related hybrid lines was also confirmed in glasshouse tests at Sydney University by Professor W. L. Waterhouse, who stated:—". . . . on the scale of 0-10 (with 10 representing complete susceptibility) . . . . your material gives a one to a very often '0' reaction." (3.)

"Westralia" has also proved to be of satisfactory quality for canning and has been freely purchased for this purpose by Plaistowes Ltd. This outlet will help to relieve market congestion during glut periods.

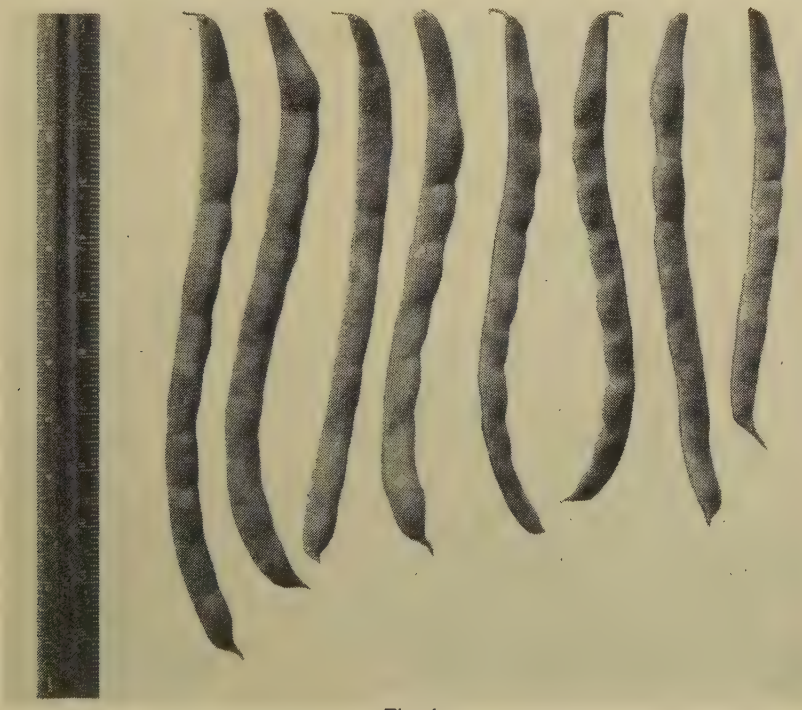


Fig. 4

Pods of "Westralia" showing typical form. In well grown crops the pods range from about 6 to 11 inches with an average of about 8 inches.

—Photo by Govt. Photographer.

Seed Certification and Distribution.

Owing to lack of facilities the growing of increased stocks of seed and their distribution cannot be undertaken by this Department. It is fortunate that Messrs B. & J. Arbuckle, Jnr., of Balcatta, who are bean growers of high repute, have agreed to propagate and distribute seed of "Westralia" which will be certified by the Department of Agriculture.

At present, seed stocks are still limited and they are being released to commercial growers only, but it is hoped that early in 1952, home gardeners may also be catered for.

ACKNOWLEDGMENT.

Grateful acknowledgment is made to Mr. E. T. Morgan, Officer in Charge, Vegetable Branch, who defined the ideal agronomic characters required in a new bean variety and placed his wide experience at our disposal during the selection work. Thanks are also due to Mr. R. Doepel, of the Plant Pathology Branch, and Mr. R. Nailard, of the Gascoyne Research Station for conducting the Carnarvon yield trial; and to Professor W. L. Waterhouse, of Sydney University, for confirming in glasshouse tests the high rust resistance of "Westralia" and related hybrid lines.

Finally, deep appreciation is expressed to Mr. R. Schultze, Messrs. B. & J. Arbuckle, Jnr., and Mr. D. Gordon, market gardeners of Balcatta, for placing land, equipment and labour at our disposal. Their efforts assisted very materially in the production of "Westralia."

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The Argentine Ant in Western Australia.

By

C. F. H. Jenkins, Government Entomologist.
P. N. FORTE, Senior Entomologist.

SUMMARY

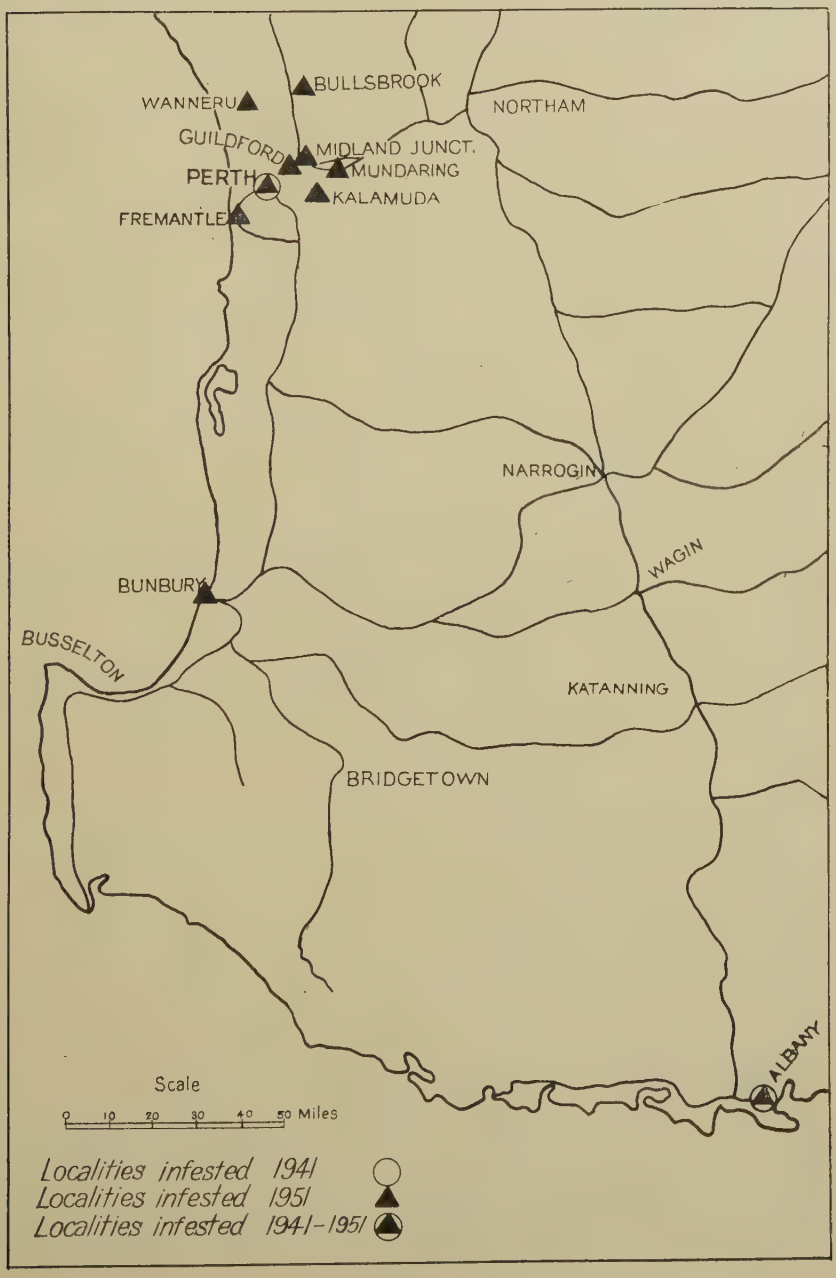
1. The Argentine ant was first recorded in Western Australia from Albany and Perth in 1941.
2. The approximate area of infestation in Western Australia is estimated at 10,000 acres.
3. Major infestations are restricted to Bunbury, Albany, Perth and various suburban districts.
4. D.D.T. sprays and the United States Government bait formula have been found effective in controlling Argentine ant infestations.
5. The general eradication of the ant with existing control measures does not appear practicable. The possibility of eradicating the pest in restricted areas, however, has been demonstrated.
6. The suitability of various new insecticides for Argentine ant control needs investigation.
7. The habits of the ant under Western Australian conditions require further study, particularly in relation to the various possible methods of distribution and colony establishment.

INTRODUCTION

The original record of the Argentine ant *(Iridomyrmex humilis)* in Australia came from Victoria in September, 1939. Western Australia first reported the pest in April, 1941, when ants were collected from Albany and the last State to report invasion was New South Wales, where the insect was recorded from Auburn in April, 1950.

DISTRIBUTION IN WESTERN AUSTRALIA

Surveys made in this State immediately following the locating of the ant at Albany showed that in 1941 its distribution was apparently confined to various suburban and city areas in addition to the southern port.



Although detailed surveys by an entomologist were not possible in all regions, the ports of Bunbury, Geraldton and Fremantle were inspected and Health Officers and Local Authorities throughout the southern portions of the State were circularised for specimens. In the city and suburbs pharmacists were questioned as to the demand for ant poisons in their district and ant sampling was done from the footpaths in the vicinity of grocers' shops, handy food stores and other premises likely to harbour ants. By this means a good indication of troublesome ant infestations was obtained and although upon investigation species of *Monomorium* were often implicated, the Argentine ant was found to be quite firmly established in several suburbs.

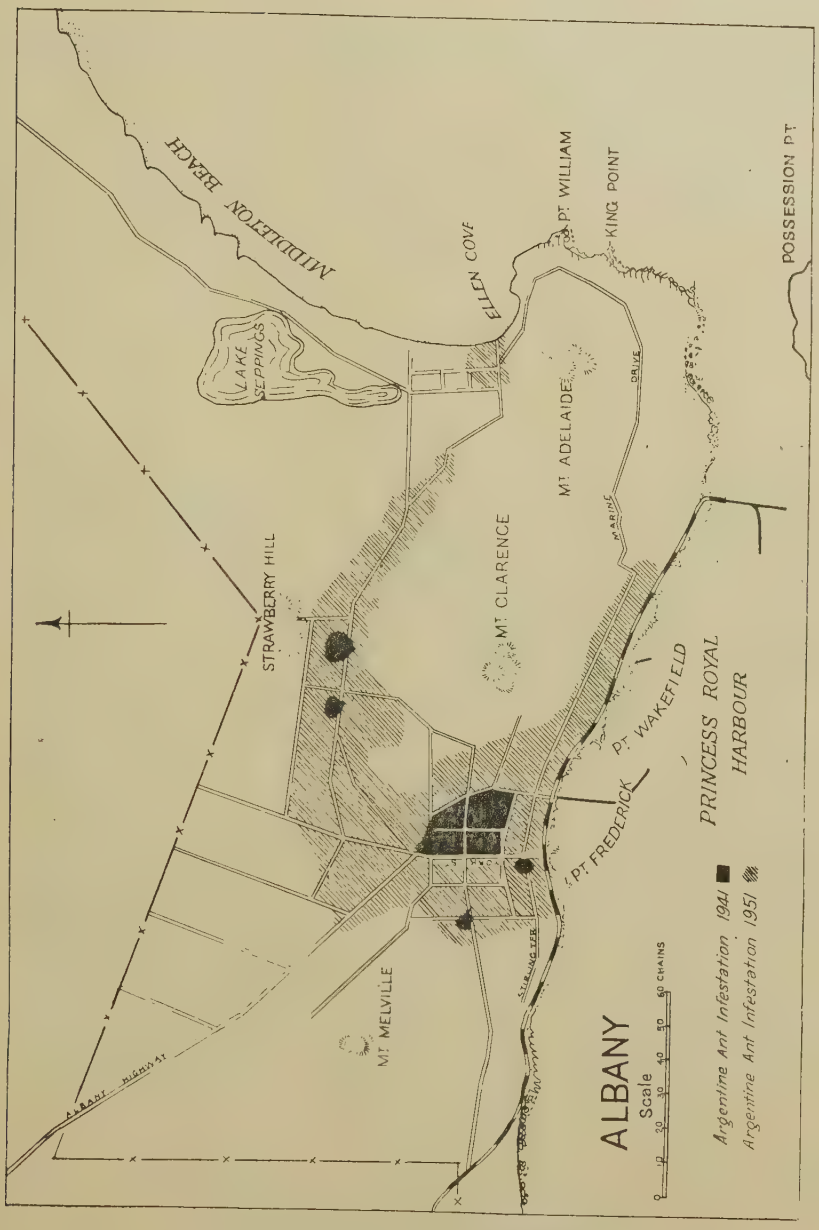
Despite efforts to prevent the spread of the ant it has steadily extended its range in the last few years and the accompanying maps will give some indication of the rate of spread since the pest was first recorded. Any estimate of the actual area infested must be open to question, but at the conclusion of the 1950 surveys it was believed to be in the vicinity of 10,000 acres.

The actual rate of spread is difficult to estimate, but extension by natural means appears to be fairly slow. The larger jumps have obviously been facilitated by the transport of nursery stock, pot plants or merchandise, despite restrictive legislation. In Bunbury it has been possible to make fairly detailed observations on what may be regarded as the natural spread of the pest. The first infestation recorded at Bunbury was in 1948 when as far as could be discovered the outbreak was confined to a building and garden covering approximately $\frac{1}{8}$ acre. In 1951, less than three years later, a survey showed the area of infestation to be approximately 30 acres, the ants having crossed several tarred roads including a main thoroughfare.

Action taken to Retard the Spread of the Ant.

Regulations were gazetted under the Plant Diseases Act restricting the movement of nursery stock and plants carrying soil from infested to clean areas of the State. General nursery inspection was intensified and other likely distribution centres were checked. Health Officers in many infested districts were gazetted as Honorary Inspectors under the Plant Diseases Act so that Local Authorities would have power to enforce Argentine ant control where householders were negligent. In 1948 the ant was added to the Third Schedule of the Vermin Act and in 1950 the Health Act was amended to include Argentine ant control.

Since that date Argentine ant investigations have been co-operatively carried out by officers of the Department of Public Health and the Department of Agriculture, the former being responsible for the organisation of control campaigns and the latter for technical recommendations and "research."

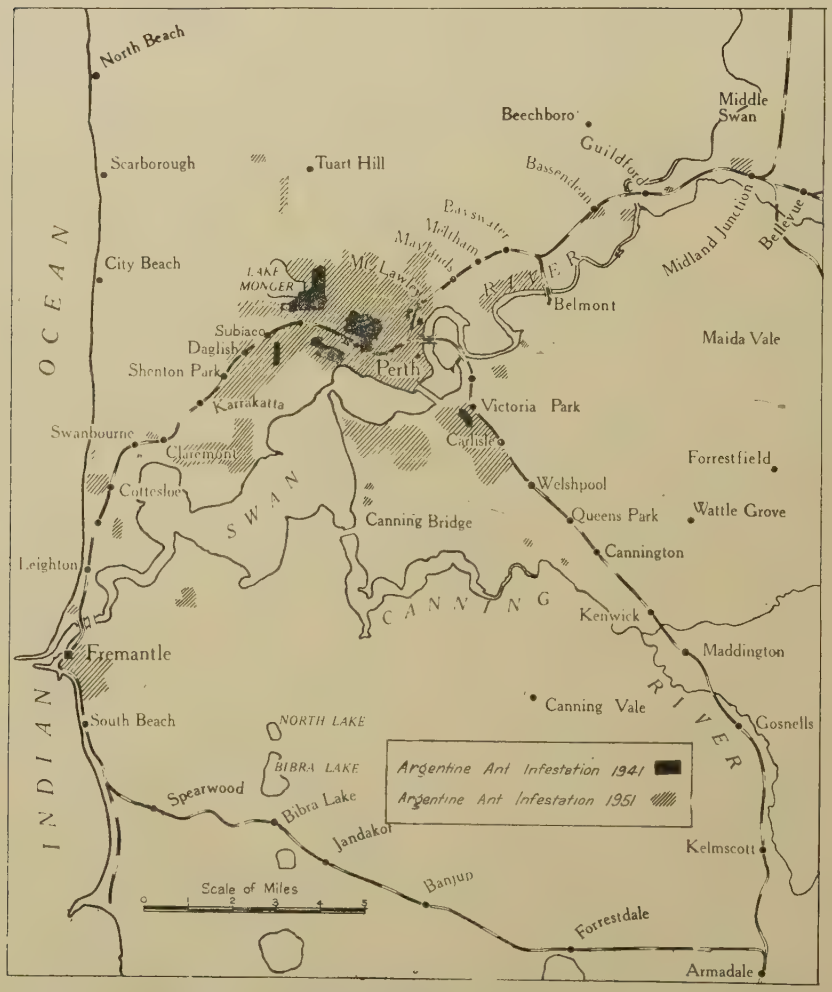


ERADICATION CAMPAIGN

In 1950 an intensive campaign was organised against the Argentine ant. The possibility of eradicating the pest under existing conditions was considered extremely unlikely, but funds were made available for an all out attack and operations were commenced in the City of Fremantle.

The ant distribution in the city was carefully mapped and the Local Authority arranged for the cleaning up of all litter and growth along fence lines likely to impede spraying operations or reduce the efficiency of the treatment.

Where eradication was being attempted a complete cover spray with 2% D.D.T. emulsion was recommended at the rate of about 80 gallons per acre. The operators commenced spraying along the street gutter and treated the intervening ground to the front fence, paying particular attention to drains and street trees, the latter being sprayed to a height of about 6 ft.



METROPOLITAN AREA

In household blocks the entire ground surface was covered, with particular attention to fence lines, house foundations, trees and shrubs.

Equipment.

Knapsack and other hand sprays quite satisfactory for individual treatments were entirely unsuited to a large scale campaign and various types of power units were investigated. The plant finally adopted was a portable Moffat Virtue spraying unit mounted on a 44-gallon drum. The drum was calibrated in 10 gallons and the output of the pump carefully calculated. The fittings comprised ¼ in. rubber pressure hose and a "shut off" gun type of hand grip in conjunction with a short rod carrying standard Rega nozzles. Double nozzles were used on each hose and with the larger holes an output was obtained of 20 gallons in 14 minutes at a pressure of 150 lb. per square inch. Under actual working conditions, however, it was not found possible to treat ¼-acre household blocks in this time or to restrict the output to 20 gallons. In actual practice about 30 gallons of spray were used per ¼-acre block.

Spraying unit showing pnuematic tyred trolley carrying 44-gallon drum and power spray.

The shifting of the plant during spraying, the presence of trees, rockeries and other obstructions all tended to increase the spraying time as well as the spray output per unit area.

The first spray unit was fitted with two 200 ft. lengths of hose and transported on a utility truck. In some instances it was possible to spray entire blocks without moving the equipment from the road but experience showed that for most areas smaller mobile units would be preferable. Pneumatic tyred mobile trolleys were then designed which could be pulled easily by one man and would enable the equipment to be taken through ordinary household gates and into relatively inaccessible spots. Two reels, each carrying 100 feet of pressure hose, were found adequate with these units for all types of work.

Cost of Campaign.

The necessity for obtaining a hundred per cent. kill renders any eradication campaign much more costly than a control programme. Furthermore, when once fairly launched such a scheme must be given full support unless the money already spent is to be wasted.

The approximate cost of one power spray and truck was £1,000; the cost of D.D.T. (2%) per acre was £13 or £100 per unit per week; the wages of four men to clear ground and operate plant plus maintenance charge was £40 per week. The total weekly cost per spraying plant was, therefore, about £140.

The approximate area treated each week by one machine was eight acres, consequently, to treat the total estimated infestation area of 10,000 acres in one year working only during the summer months, 50 spray plants would be required at a weekly expenditure of £7,000.

Results of the Eradication Campaign.

The results of the work at Fremantle were carefully studied and it was evident that a great improvement in the ant position had been obtained throughout the treated area. It was also apparent that complete eradication had not been achieved, especially where follow-up baiting and spraying had not been done by the householder.

A change of policy was obviously necessary and at the present time the control of Argentine ants on private property is the responsibility of the owner or occupier. Government assistance, however, is rendered by making spraying and baiting material available at reduced rates and by making spraying ingredients and spray outfits available free of cost to Local Authorities for the treatment of roads and public places.

THE FEASIBILITY OF ERADICATING THE ARGENTINE ANT AND OF MAINTAINING AN ANT FREE AREA

On limited areas at least there is no doubt that the Argentine ant can be completely eradicated. The removal of extensive infestations from residential areas depends as much on the perseverance of individual householders and the degree of general co-operation existing as to the efficiency of the actual control methods themselves.

The possibility of eradicating the ants from a suburban institution entirely surrounded by tarred roads and occupying a 7½-acre block is at present being investigated.

Pre-treatment cleaning up was carefully carried out and trees and shrubs were trimmed up from the ground and away from adjacent buildings. The biggest problem was the garden section where refuse was trenched in every day and where several large tuart trees (*Eucalyptus gomphocephala*) hollowed out with "dry rot" gave harbourage to large nests of ants.

Barrier sprays being applied along back fence and lane.

The entire ground surface right to the street kerbs was sprayed with 2% D.D.T. emulsion. Building foundations were carefully sprayed and trees and shrubs were given special attention. The outdoor ant population was immediately reduced and a survey a week after treatment revealed only one active nest.

In accordance with experience elsewhere following outdoor spraying, increased ant activity occurred within the institution. Kerosene solutions of 4% D.D.T. were used to paint skirting boards, ¼-rounds and window frames, and although ant activity was greatly reduced, some strong trails persisted for several weeks. To deal with such trails the standard poison bait was used and no further trouble was experienced for the remainder of the year. Periodic surveys of the grounds showed that active nests still remained in association with six of the large trees already mentioned and that trails from some of these trees were scavenging in the vegetable garden. In several instances, however, the ants showed no inclination to reach the ground and nested either in rotted out hollows or under loose sheets of bark.

The possibility of destroying these tree nests with poison bait was tested and the United States Government formula was used from May until the following spring.

Throughout the Argentine ant investigations in this State the unpredictable reaction of the ant to poison baits has been a difficulty. In the present instance ants from about half the nests were attracted to the baits at once while others showed no interest over a period of three months. A feature of the experiment was the fact that after

Barrier sprays being applied along lawn edge and front footpath.

long periods of indifference the ants would sometimes suddenly swarm over the baits in large numbers. On two occasions following such mass feeding, large numbers of sluggish workers and some queens were found clustered on the tree in proximity to the bait. These ants had apparently been affected by the poison as the next day they were dead in a heap at the base of the tree and could literally be picked up in handfuls. This occurrence was noted in baiting trails on two other occasions during the same winter.

In the case of one large hollow tuart the ants were not observed to come to the ground or to touch the bait over a period of five months. It seemed likely that the ants had an adequate food supply on the branches and foliage of the tree and this raises an important problem where complete eradication is sought.

In the early summer of 1950 all the large trees were grubbed and burnt and it was then found that several hollow ones still harboured active colonies. Several colonies escaped before the trees were burnt and these migrated to the nearest buildings, causing minor trouble for a short period. After the clearing up of the grounds was completed the ant infested sections were sprayed with 1% D.D.T. and effective control was achieved. At the time of writing the only area showing any ant activity is the vegetable garden where kitchen refuse is being continually buried. Here weak colonies can occasionally be found and require spraying.

The foregoing has been set out in some detail in order to emphasise the difficulties involved in eradicating ants from such an area as the one chosen and also to indicate the very effective results which can be achieved by persistent action.

Barrier sprays being applied along boundary fence and street curb.

Maintaining an Ant Free Area.

The possibility of maintaining an ant free area within an infested zone has also been investigated in two suburbs. The results indicate that with periodic attention the establishment of the pest can be prevented. In one instance the household block was entirely free of Argentine ants at the commencement of the experiment, in the other case a small infestation had to be eradicated from the backyard. By periodic boundary spraying (twice each summer) and appropriate spot spraying and baiting whenever ant invasions were noticed, the occupation of both premises by the Argentine ant has been prevented for three summers. The insecticide used was 2½ gallons of 20% D.D.T. emulsion and 1 pint of bait on one property and 2 gallons of 20% D.D.T. and 8 oz. of bait on the other.

OBSERVATIONS ON THE HABITS OF THE ANTS

Relationship of Argentine Ants with Aphides and Coccids.

The association of the ants with other insects such as aphides and scale insects is of extreme importance both from the point of view of controlling the hemipterous pests and from the ant control aspect. Serious infestations of aphides, scale insects and mealy bugs may develop following the establishment of the ant in a particular locality. In the Albany district street trees (*Pittosporum* sp.) and peppermint (*Agonis flexuosa*) developed heavy populations of mealy bug and aphis. The aphis proved to be an indigenous species (*Anomalaphis comperei* Pergande) collected only once previously by

George Compere in 1907. It seems probable that its abundance now at certain times of the year is definitely associated with the spread of the Argentine ant, as the aphis has so far not been re-collected in non ant-infested situations. This is the only aphis-Argentine ant association so far discovered locally in which an earth "shed" may be built on the foliage of the host plant for the protection of the aphis.

General Activity.

Ant activity likely to inconvenience householders is almost entirely confined to the summer months. The first major movements occur about October when ants may be seen swarming from their nests following a warm sultry day. Queen ants have not been observed to fly, but are quite often found following a forage trail. They may also be seen wandering unattended after sultry conditions and a period of intense ant activity. Male ants have been observed flying to lights on warm humid nights on several occasions.

Temperature and humidity have an important effect upon ant activity. In the summer months the insects are often attracted to moisture and many trail along garden hoses to the tap. In the winter time on the other hand they seek dry sheltered situations. Activity throughout the day varies according to weather conditions. During a heat wave little ant movement can be observed at the hotter periods of the day. In the early morning and late afternoon, however, ant trails may be quite active and feeding may continue long after dark on warm sultry nights.

Nesting Sites.

Nests are usually shallow and may be located under flat stones, concrete slabs or heaps of rubbish. Compost pits, manure heaps and flower pots are also favoured. Hollow trees are particularly attractive and nests situated in such positions often complicate the work of control.

Although requiring further investigation there is evidence to suggest that numbers of worker ants isolated from a nest may band together and survive as a "colony" for some time. On several occasions isolated bands of ants have been found inhabiting tiny cavities in trees. Persistent ant activity indoors after heavy outside spraying and where no true nest can be found also suggests that isolated bands of ants may survive for some time.

Relationship of Ant Behaviour to Control Measures.

From the habits outlined above it would appear that the natural spread of the ant is comparatively slow and that artificial dissemination by means of pot plants, nursery stock, stable manure and various merchandise is responsible for the comparatively rapid extension of the ants' range in Western Australia.

It has so far shown little inclination to colonise uncultivated bush country with the exception of the Taylorina *Psoralea* swamp at Albany. In that area it has also extended into dry scrub-covered blocks adjacent to infested habitations.

Where ants are forced to trail across thoroughfares, busy tarred roads may present quite effective barriers to ant dispersal for long periods, but where storm water drains and similar underground channels provide alternative routes free from disturbance, roadways offer only minor hindrance. Overhead wires, lift wells and drain pipes may provide access into large buildings and should be carefully surveyed when obscure sources of infestation are being traced.

The foraging and trailing habits of the queens are extremely important in considering control operations. The fact that these females trail with the workers increases the efficiency of both spray and bait treatment, but it also increases the possibility of fertile queens and worker associates being fortuitously spread by various articles of merchandise, although this aspect of the problem requires much more detailed investigation.

CONCLUSION

The results of the investigations just outlined indicate that the Argentine ant has assumed the role of a major pest in Western Australia and that drastic action will be necessary to retard the spread of the insect.

The possibility of eradicating the ant with the present control measures would appear to be remote, but there is ample evidence that with co-operative action the pest can be controlled and that its spread to new districts can be either prevented or greatly delayed.

New insecticides offer the greatest hope of improving upon present control methods and work is already in hand to test out some of the latest preparations.

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A Useful Light Grading Implement

The following is extracted from Bulletin No. 11, "Mole Drainage in New Zealand," of Massey Agricultural College, New Zealand, and has been proved an effective and useful implement in the irrigation areas of Western Australia.

H. K. GIBSONE.
Officer in Charge Irrigation.

"Apart from the usual stock-in-trade of farm implements, very few farmers have a levelling implement. A very effective and comparatively cheap implement is illustrated. This leveller was designed by Mr. J. Johns, Belfast, near Christchurch, and details of it were kindly supplied by the Canterbury Agricultural College, Lincoln. Mr. Johns has kindly agreed to the writers publishing a description of the implement. It can be made by any handy man, is very effective, and, with a little practice, easy to operate. For effective work it requires four horses, or the equivalent in tractor power, to pull it. For best results the soil should be loose and the tilth fairly fine. It is now used extensively on the Massey College Farm, the final levelling being carried out as one of the last operations prior to the sowing of permanent pasture.

"In operating the leveller the handle is held so that the rear 12in. x 3in. is level, or tilting downward at the back, when a load is being picked up. The soil pushed in front of the leveller can be spread by raising the handle slowly, or tipped, more or less in a heap, by raising it forward quickly. The manipulation can be done with one hand. During operation the leveller accumulates a good deal of soil on the flat 12in. x 3in. This added weight gives the implement more bite. If still more weight is required the operator may stand on the level when passing over a high spot.

Front View of 16ft. Johns Leveller

Note the piece of T iron along the front edge to prevent wear of the timber and to provide an edge to "bite" into the soil. The hook engages in a loop which can be formed in any part of the chain by using a ring through which the loop will pass easily but not too loosely. This enables the leveller to be pulled with its length at right angles to the direc ion of pull after the manner of a scoop, or obliquely to the direction of pull as with a road-grader blade. Either method of using the leveller may be employed, although the former is generally most useful.

Rear View of Leveller

The following points should be noted:—(1) The T iron is bolted to the bottom edge of the front piece of 12in. x 3in. timber by means of 3in. coach screws. (2) The rear piece of 12in. x 3in. which is on its flat is bolted to the front piece of 12in. x 3in. half an inch from the bottom edge of the latter. This enables the leveller to be tilted back a little to give the edge more "bite" if required. The bolts by which the two pieces of 12in. x 3in. are held together are 15in. long and their heads and nuts countersunk. (3) The chains pass through the front piece of 12in. x 3in. and are fastened by means of a 3in. coach screw to the rear (flat) 12in. x 3in. (4) The chain is attached at points 3ft. 2in. (one-fifth of the length of the leveller from each end). (5) The handle is attached to the rear 12in. x 3in. by two U bolts. (6) The handle is of 1in. galvanised iron piping and stayed to the leveller by $\frac{5}{8}$in. iron rods.

"The materials required in its construction are as follows:—

12in. x 3in. timber (Oregon pine, preferably)—two 16ft. pieces.

$2\frac{1}{2}$in. T iron—one 16ft. piece.

Strong chain—19ft. long.

1in. galvanised iron pipe handle, 6ft. long and bent to shape.

$\frac{5}{8}$in. round iron—two pieces, each 5ft. long.

U bolts for attaching handle to leveller and fixing ends of $\frac{5}{8}$in. round iron stays to handle—three.

3in. coach screws for attaching T iron and ends of chain—10.

15in. bolts with nuts and washers for fixing two pieces of 12in. x 3in. together—eight."

STOCK FOODS

The following stock foods have been registered with the Department of Agriculture under the Feeding Stuffs Act, 1928-1948, for the year commencing 1st July, 1951

Stock Food.	Reg. No.	Brand.	By whom Registered.	Materials from which Made.	Registered Analysis.							
					Crude Protein.	Crude Fat.	Crude Fibre.	Sodium Chloride.	Phos. Acid (P_2O_5).	Calcium. (Ca).	Other.	
					% (Min.)	% (Max.)	% (Max.)	% (Max.)	% (Max.)	% (Max.)	%	%
A.—SIMPLE FOODS.												
1.—*Meat Meals.*												
Meat Meal	11	STATE ABATTOIRS, MIDLAND JUNCTION	State Abattoirs, Midland Junction	Animal offal and residues	52·0	15·0	2·0	....	3·98*	3·44*	....	....
Do.	18	W.A.M.E.	West Australian Meat Export Works	Meat, bone and blood	45·0	13·0	2·0	....	12·0	11·0	....	....
Do.	23	COOGEE	Anchorage Butchers Pty., Ltd.	Waste meat products	36·9	18·6	1·3	1·0	12·73	12·5	....	....
Whale Meal	116	A.W.C.	Australian Whaling Commission	Whale carcase	52·0	8·0	1·0	0·4	13·0	12·0	....	....
Protein Meat Meal	117	CHAMPION	Sims Cooper (F.W.) Pty., Ltd.	Meat Works offal	50·0	15·0	5·0	....	....	....	....	....
2.—*Meat and Bone Meals.*												
Meat and Bone Meal	33	PENNELLS	C. A. Kirkby & Sons	Meat and Bones	50·0	12·0	4·0	4·0	12·0	14·0	....	....
Do. do.	44	ABERDEEN	W. R. & N. N. Clarke	do.	50·0	13·0	2·0	....	....	....	....	....
Do. do.	45	S.M.P.	do. do.	do.	50·0	13·0	2·0	....	....	....	....	....
Meat and Bone Meal No. 1	66	TB & S in diamond, No. 1	T. Borthwick & Sons (Aust.), Ltd.	Animal offals	40·0	17·0	4·0	1·0	12·0	10·0	....	....
Meat and Bone Meal No. 2	67	TB & S in diamond, No. 2	do. do. do.	do.	50·0	20·0	4·0	1·0	9·0	8·0	....	....
Meat and Bone Meal	68	TB & S in diamond, Brooklyn	do. do. do.	do.	50·0	12·0	4·0	1·0	8·0	6·0	....	....
Do. do.	119	VITA-MEAL	Westralian Farmers Co-op., Ltd.	Meat and bone meal	40·0	9·0	2·0	....	....	....	....	....
3.—*Blood Meals.*												
Blood Meal	69	TB & S in diamond	T. Borthwick & Sons (Aust.), Ltd.	Animal blood	75·0	5·0	5·0	....	....	....	....	....
4.—*Liver Meals.*												
5.—*Milk Foods.*												
Dried Buttermilk Powder	8	SUNNY WEST	South-West Co-operative Dairy Farmers, Ltd.	By-product of butter manufacture	32·1	5·7*	....	....	....	....	....	....
Krafco	35	KRAFCO	Kraft Walker Cheese Co. Pty., Ltd.	Prepared from whey derived from milk in the manufacture of cheddar cheese	10·0	1·5	....	4·2	2·4	1·5	....	....
Dried Buttermilk...	46	MAFFCO	W. R. & N. N. Clarke	By-product of butter manufacture	30·0	5·0*	....	....	....	....	....	....

6.—Wheat and Wheaten By-products.											
Stock Meal	1	MILLERS	W. H. Milne & Co.	Crushed wheat	8·0	....	5·0	..	....	....	....	....
Wheat Meal	2	do.	do. do.	do.	8·0	....	5·0	....	....	....	....	....
Stock Meal	7	PEERLESS	Peerless Roller Flour Mills Pty., Ltd.	Wheat	8·0	....	9·0	....	....	....	....	....
Stock Meal	9	BORONIA	The Boronia Flour Mills Pty., Ltd.	Wheat (whole)	8·0	....	5·0	....	....	....	....	....
Bran Meal	10	do.	do. do. do.	Wheat, bran, pollard, and wheat germ	12·5	1·5*	7·0	....	....	....	....	....
Stock Meal	20	YORK FLOUR MILLING CO.	The York Flour Milling Co., Ltd.	Wheat	12·0	3·0*	7·0	....	....	....	....	....
Branato	21	do. do.	do. do. do.	do.	12·0	3·0*	7·5	....	....	....	....	....
Pollato	22	do. do.	do. do. do.	do.	12·0	3·0*	7·0	....	....	....	....	....
Wheat Meal	47	WESFARMERS	Westralian Farmers Co-op., Ltd.	do.	8·5	1·0*	3·0	....	....	....	....	....
Wheaten Meal	95	BRANATO	W. Thomas & Co. (W.A.), Ltd.	do.	8·0	....	10·0	....	....	....	....	....
Do.	96	"C" MEAL	do. do. do.	do.	8·0	....	10·0	....	....	....	....	....
Do.	97	POLLATO	do. do. do.	do.	8·0	....	10·0	....	....	....	....	....
7.—Oats and Oaten By-products.												
Oaten Meal	48	WESFARMERS	Westralian Farmers Co-op., Ltd.	Oats	8·0	3·0 1·0*	9·0	....	....	....	....	....
8.—Oil Seed Meals.												
Pure Linseed Oil Meal	76	MEGGITT'S	Elder, Smith & Co., Ltd.	Pure linseed from which proportion of the oil content has been extracted by mechanical pressure	30·0	4·0*	10·0	....	....	....	....	....
B.—COMPOUND FOODS.												
1.—Protein Meals.												
Protein Meal "B"	49	WESFARMERS	Westralian Farmers Co-op., Ltd.	Whale meal, meat meal, bone meal, limestone, salt,	40·0	10·0 5·0*	5·0	6·0	....	12·0	....	....
Pig Protein Meal	65	do.	do. do. do.	Whale meal, liver meal, meat meal, bone meal, buttermilk, wheat germ, salt, limestone	35·0	7·0 4·0*	5·0	6·0	....	12·0	....	....
35% Quick Grow	98	THOMAS	W. Thomas & Co. (W.A.), Ltd.	Meat meal, whale meal, blood meal, limestone, manganese sulphate, salt, potassium iodide, iron sulphate, riboflavin	35·0	12·5	4·0	6·0	9·5	15·0	....	....
40% Protein Quick Lay	99	do.	do. do. do.	do. do. do.	40·0	12·5	4·0	6·0	9·5	15·0	....	....
50% Protein Egg Protein	100	do.	do. do. do.	do. do. do.	50·0	12·5	4·0	6·0	9·5	15·0	....	....
30% Buttermilk Concentrate (Egg Milk)	101	do.	do. do. do.	Buttermilk powder, albumen milk powder, pollard, limestone, salt, manganese sulphate, potassium iodide, iron sulphate, riboflavin	30·0	8·0*	4·0	2·5	1·0	10·0	....	....

* Minimum.

Stock Food.	Reg. No.	Brand.	By whom Registered.	Materials from which Made.	Registered Analysis.							
					Crude Protein.	Crude Fat.	Crude Fibre.	Sodium Chloride.	Phos. Acid (P_2O_5).	Calcium. (Ca).	Other.	
2.—*Cattle Foods.*					% (Min.)	% (Max.)	% (Max.)	% (Max.)	% (Max.)	% (Max.)	%	%
Cattle Food	13	EVE-LYN	Tropical Traders & Patersons, Ltd.	Pollard, salt, limestone, chalk, animal charcoal, molasses, sulphur, sulphate of iron, copper sulphate, and medicinal herbs	5·0	2·0*	5·5	13·0	4·0	9·5	Sulphur 3·6	....
Sweet Dairy Meal	50	WESFARMERS	Westralian Farmers Co-op., Ltd.	Wheat meal, bran, oat meal, linseed meal, pollard, molasses, bone meal, ground limestone, malt combings, calcium carbonate, salt, bluestone	11·0	2·5*	6·0	1·0	....	1·0	Copper race	....
16% Protein Sweet Dairy Food	102	THOMAS	W. Thomas & Co. (W.A.), Ltd.	Bran, pollard, wheat meal, cocoanut meal, malt combings, tech. urea, bone flour, molasses, limestone, salt, manganese sulphate, potassium iodide, iron sulphate	16·0	1·5*	8·0	2·0	1·0	4·0	....	....
Sweet Dairy Food	125	WESTERN	David Gray & Co., Ltd.	Malt grains, oats, barley, molasses, yeast, mill offal	16·0	3·0*	10·0	1·5	1·5	2·0	....	....
3.—*Calf Foods.*												
Calf Food	14	EVE-LYN	Tropical Traders & Patersons, Ltd.	Wheat, pollard, linseed (whole), salt, sugar, chalk, turmeric, sodium bicarbonate, cream of tartar, foenugreek, ginger, coriander, copper sulphate (trace), bole armenian	8·5	2·0*	3·86	3·5	1·25	1·0	Sulphur 1·75	....
Calf Food	37	VETAMAC	A. H. McDonald & Co.	Wheat, pollard, maize meal, linseed meal, milk, sugar, mutton bird oil	15·35	7·5*	1·5	....	....	....	....	....
Do.	43	HARPER'S "STAR"	Robt. Harper & Co., Ltd.	Oats, linseed, maize, barley meal, rice meal, condiments	12·0	12·5*	7·0	0·8	....	0·4	....	....
Calf Meal	51	WESFARMERS	Westralian Farmers Co-op., Ltd.	Wheat meal, maize meal, barley meal, bran, pollard, buttermilk, linseed meal, calcium carbonate, bone meal, ground limestone, salt, copper sulphate	13·0	3·5*	6·0	1·0	....	1·0	Copper Trace	....
Calf Food	77	PARSONS	Parsons Bros. & Co. Pty., Ltd.	Wheat, oat branning, linseed, ground limestone, common salt	12·0	2·0*	6·0	1·0	....	....	....	....
17% Protein Calf Milk	103	THOMAS	W. Thomas & Co. (W.A.), Ltd.	Buttermilk powder, albumen, cocoanut meat, pollard, bone flour, oyster flour, salt, manganese sulphate, pottasium iodide, iron sulphate, riboflavin	17·0	1·5*	6·0	1·5	0·8	2·5	....	....

20% Protein Calf Food	104	do.	do. do. do.	Linseed meal, cocoanut meal, milk powder, pollard, bone flour, oyster flour, salt, manganese sulphate, potassium iodide, iron sulphate, riboflavin	20·0	2·5*	8·0	1·5	0·8	2·5	...	....
Kaf-o-vite	91	KAF-O-VITE...	Goldsbrough, Mort & Co. Ltd.	Rice meal, barley meal, wheat pollard, linseed meal, bone charcoal, calcium carbonate, cane sugar	16·5	.	.	. .	.	. .	...	...
Calf Food ...	126	WESTERN	David Gray & Co., Ltd.	Malt grains, peanut meal, milk powder, yeast, pollard	20·0	6·0*	7·5	1·5	1·5	1·0	..	.
4. *Sheep Foods.*												
Sheep Food	15	EVE-LYN	Tropical Traders & Patersons, Ltd.	Pollard, salt, limestone, chalk, animal charcoal, molasses, sulphur, sulphate of iron, copper sulphate, medicinal herbs	5·0	1·0*	5·0	13·5	4·0	9·6	Sulphur 3·6	...
Sheep Maintenance Cubes	52	WESFARMERS	Westralian Farmers Co-op., Ltd.	Oat meal, wheat meal, barley meal, linseed, cocoanut meal, bone meal, molasses, salt, minerals, ground limestone.	14·0	3·0*	7·5	5·0	.	1·0	....	..
Sheep Breeder Cubes	53	do.	do. do. do.	Oat meal, wheat meal, barley meal, linseed, cocoanut meal, bone meal, molasses, salt, limestone	18·0	3·0*	7·5	1·0	...	1·0	.	.
Maintenance Sheep Nuts	127	WESTERN	David Gray & Co., Ltd.	Malt grains, barley, oats, linseed, yeast, meat meal	17·5	3·0*	7·5	1·5	1·5	2·0	...	
Ewe and Lamb Sheep Nuts	128	do.	do. do. do.	Malt grains, yeast, linseed, meat meal	20·0	3·0*	7·5	1·5	1·5	2·0	.	....
5.—*Poultry Foods.*												
Laying Mash	3	MILLERS ..	W. H. Milne & Co. ...	Bran, pollard, wheat meal, grist oats, meat meal, bone meal, limestone, common salt, oyster flour	15·0	4·0*	5·5	1·5	2·0	4·0	....	.
Fattening Mash ...	4	do.	do. do. ..	Bran, pollard, wheat meal, grist oats, meat meal, oyster grit, common salt, limestone	13·0	4·0*	6·0	1·75	3·0	3·5	....	..
Laying Mash	34	K.B. . .	C. A. Kirkby & Sons	Wheat meal, meat meal, bone meal, bran, pollard, oyster flour	13·0	3·5*	7·0	2·0	1·5	2·0	....	..
Grower's Mash	54	WESFARMERS	Westralian Farmers Co-op., Ltd.	Wheat meal, pollard, oat meal, bran, buttermilk, meat meal, salt, calcium carbonate, ground limestone	13·0	4·0*	7·5	1·0	....	1·0	....	..
Growers' Pellets	55	RED COMB ...	do. do. do.	Wheat meal, pollard, oat meal, bran, buttermilk, meat meal, salt, ground limestone	13·0	4·0*	7·5	1·0	....	1·0	....	..
Laying Mash No. 1	56	WESFARMERS	do. do. do.	do. do. do.	14·0	4·0*	7·0	1·0	....	1·0	...	....
Laying Pellets No. 1	57	RED COMB ...	do. do. do.	Wheat meal, bran, oat meal, pollard, meat meal, buttermilk, ground limestone, liver-meal, salt	14·0	4·0*	7·0	1·0	....	1·0	...	....

* Minimum.

Stock Food.	Reg. No.	Brand.	By whom Registered.	Materials from which Made.	Registered Analysis.							
					Crude Protein.	Crude Fat.	Crude Fibre.	Sodium Chloride.	Phos. Acid (P_2O_5).	Calcium (Ca).	Other.	
					% (Min.)	% (Max.)	% (Max.)	% (Max.)	% (Max.)	% (Max.)	%	%
Poultry Fattening Mash	58	WESFARMERS	Westralian Farmers Co-op., Ltd.	Barley meal, wheat meal, pollard, oat meal, bran, buttermilk, ground limestone, salt	13·0	2·5*	6·0	1·0	....	1·0	..	....
All-Mash	59	do.	do. do. do.	Bran, pollard, wheat meal, oat meal, wheat germ, meat meal, bone meal, oyster flour, riboflavin	16·0	4·0*	6·0	....	0·5	2·0	..	....
All-Mash Pellets	60	do.	do. do. do.	do. do. do.	16·0	4·0*	6·0	..	0·5	2·0	....	....
Growing Mash	70	MORLAY	R. B. Young	Wheat meal, bran, pollard, meat meals, bone meal, oyster shell, flour, limestone, minerals, riboflavin	14·0	3·0*	5·5	2·0	....	5·0	....	....
Laying Mash	71	do.	do.	Wheat meal, bran, pollard, meat meal, bone meal, ground limestone, oyster shell flour, minerals	16·0	3·0*	5·5	2·0	....	4·0	..	....
D Mash (Fattening)	72	do.	do.	Wheat meal, bran, pollard, meat meal, bone meal, minerals	11·0	3·0*	5·5	1·5	....	4·0	....	....
Growing Mash	78	CAPITOL	The Maylands Milling Co. Pty., Ltd.	Bran, pollard, wheat meal, meat meal, bone meal, shell grit, salt, riboflavin, fish oil	15·0	3·5*	5·0	1·0	....	3·5*	..	..
No. 1 Laying Mash	79	do.	do. do. do.	Bran, pollard, wheat meal, meat meal, bone meal, shell grit, salt	15·0	3·5*	5·0	1·0	...	3·5	....	...
Special Laying Mash	80	do.	do. do. do.	do. do. do.	17·0	3·5*	5·0	1·0		3·5*	....	...
16% Protein Laying Mash No. 1	105	THOMAS	W. Thomas & Co. (W.A.), Ltd.	Bran, pollard, meat meal, wheat meal, wheat germ, whale meal, blood meal, limestone, salt, manganese sulphate, potassium iodide, iron sulphate, riboflavin	16·0	2·5*	6·0	2·0	2·0	3·75	....	....
20% Protein Laying Mash	106	do.	do. do. do.	Bran, pollard, blood meal, meat meal, milk powder, lime, salt, manganese sulphate, potassium iodide, iron sulphate, riboflavin, wheat germ	20·0	1·5*	6·0	2·0	2·0	3·75	....	....
Fattening Mash	107	do.	do. do. do.	Bran, pollard, wheat meal, meat meal, milk powder, limestone, salt, manganese sulphate, potassium iodide, iron sulphate, riboflavin, wheat germ	15·0	2·0*	6·5	1·5	1·0	3·75	....	....
A1 Laying Mash	129	WESTERN	David Gray & Co., Ltd.	Mill offal, wheat meal, meat meal, bone meal, yeast	14·0	3·0*	5·0	0·5	0·5	0·5	....	....
Laying Pellets	130	do.	do. do. do.	do. do. do.	14·0	3·0*	5·0	0·5	0·5	0·5	....	....

6.—*Chick Foods.*

Chickstarter	5	MILLERS	W. H. Milne & Co. . .	Bran, pollard, wheat meal, meat meal, whey powder, oyster flour, bone meal, oat meal, common salt, cod liver oil, riboflavin	16·0	4·0*	5·5	1·5	2·0	3·0	...	...
Chickbuilder	6	do.	do. do.	Bran, pollard, wheat meal, cod liver oil, bone meal, gristed oats, common salt, whey powder, oyster flour	14·0	4·0*	5·5	1·5	2·0	3·5	....	...
Chick Food	36	ROYAL SEAL	J. & W. Bateman, Ltd.	Wheat, pannicum seed, peas, maize, shell grit	10·0	2·0*	4·0	..	....	....	....	...
Do.	41	W.A.P."APEX"	W.A. Produce Co.	Wheat, maize, peas, oats, shell grit	10·0	3·0*	6·5	....	....	2·0*	....	..
Do.	42	H. & C.	Haynes & Clements	Wheat, maize, peas, grit	9·0	1·5*	4·5	..	..	....	...	...
Chick Mash "A"	61	WESFARMERS	Westralian Farmers Co-op., Ltd.	Wheat meal, oat meal, pollard, bran, buttermilk, meat meal, liver meal, maize meal, calcium carbonate, manganese sulphate, salt, vitaminised fish oil	15·0	4·0*	7·0	....	....	....	.	..
Chick Pellets "A"	62	RED COMB	do. do. do.	Wheat meal, pollard, bran, oat meal, ground limestone, maize meal, calcium carbonate, manganese sulphate, salt, vitaminised fish oil	15·0	4·0*	7·0	...	..	....	....	..
Chick Mash "B"	63	WESFARMERS	do. do. do.	Wheat meal, oat meal, pollard, bran, maize meal, buttermilk, meat meal, ground limestone, calcium carbonate, salt, vitaminised fish oil	14·0	4·0*	7·0	1·0	....	1·0	..	..
Chick Pellets "B"	64	RED COMB	do. do. do.	do. do. do.	14·0	4·0*	7·0	1·0	....	1·0	....	....
Chick Starter	73	MORLAY	R. B. Young	Wheat meal, bran, wheat germ, milk powder, bone meal, meat meal, liver meal, oyster grit, minerals, vitaminised oil, riboflavin	18·0	3·0*	5·5	1·75	....	4·0	....	....
Chick Allmash	74	do.	do.	Wheat meal, bran, meat meal, milk powder, bone meal, oyster grit, wheat germ, minerals, riboflavin	15·0	3·0*	6·0	1·75	....	4·0	....	..
Chick Starter	81	CAPITOL	The Maylands Milling Co. Pty., Ltd.	Bran, pollard, wheat meal, meat meal, bone meal, shell grit, salt, riboflavin, emulsified fish oil	16·0	3·5*	5·0	1·0	....	3·5*	....	..
25% Protein Chicken Milk No. 1	108	THOMAS	W. Thomas & Co. (W.A.), Ltd.	Milk powder, meat meal, whale meal, bone meal, blood meal, pollard, limestone, salt, manganese sulphate, potassium iodide, iron sulphate, riboflavin	25·0	1·5*	4·0	3·5	5·5	15·0	....	..
Chicken Milk No. 2	109	do.	do. do. do.	Milk powder, bone meal, pollard, limestone, salt, manganese sulphate, potassium iodide, iron sulphate, riboflavin	20·0	1·5*	4·0	3·5	2·5	15·0	...	..
Chicken Grain	110	do.	do. do. do.	Wheat, maize, peas, shell grit	9·0	·5*	4·5	....	....	....	.	

* Minimum.

Stock Food.	Reg. No.	Brand.	By whom Registered.	Materials from which Made.	Registered Analysis.							
					Crude Protein.	Crude Fat.	Crude Fibre.	Sodium Chloride.	Phos. Acid (P_2O_5).	Calcium (Ca).	Other.	
					% (Min.)	% (Max.)	% (Max.)	% (Max.)	% (Max.)	% (Max.)	%	%
Chick Starter	111	THOMAS	W. Thomas & Co. (W.A.), Ltd.	Bran, pollard, wheat meal, meat meal, blood meal, milk powder, crayfish meal, bone flour, lucerne meal, wheat germ, limestone, salt, manganese sulphate, riboflavin, cod liver oil, potassium iodide	18·0	2·5*	6·0	1·5	3·0	2·5	....	....
Chick Grower	112	do.	do. do. do.	Bran, pollard, wheat meal, meat meal, blood meal, buttermilk powder, lucerne meal, limestone, salt, manganese sulphate, potassium iodide, iron sulphate, riboflavin, wheat germ	15·0	2·5*	6·0	1·25	1·0	1·5	....	....
Chick Starter	131	WESTERN	David Gray & Co., Ltd.	Meat meal, milk powder, vitamin "A" oil, yeast, maize, liver meal	16·0	3·0*	5·0	0·5	0·5	0·5	....	....
Chick Builder	132	do.	do. do. do.	Mill offal, wheat meal, meat meal, yeast, milk powder, maize	15·0	3·0*	5·0	0·5	0·5	0·5	....	....
7.—*Pig Foods.*												
Pig Food	16	EVE-LYN	Tropical Traders & Patersons, Ltd.	Pollard, salt, limestone, chalk, sulphur, animal charcoal, sulphate of iron, limonite, copper sulphate, medicinal herbs	5·0	1·0*	5·0	9·75	3·75	9·5	Sulphur 4·5	.. .
Pig Mash	75	MORLAY	R. B. Young	Wheat meal, pollard, meat meal, ground limestone, minerals	13·0	3·0*	5·5	2·0	....	4·0	....	.. .
Pig Starter	113	THOMAS	W. Thomas & Co. (W.A.) Ltd.	Bran, pollard, barley meal, wheat meal, meat meal, whale meal, blood meal, bone flour, manganese sulphate, limestone, salt, potassium iodide, iron sulphate, riboflavin	18·0	2·5*	6·5	2·0	1·25	3·75	....	.. .
Pig Grower	114	do.	do. do. do.	do. do. do.	16·0	2·5*	6·5	2·0	0·5	3·75	....	....
Pig Fattening Mash	118	WESFARMERS	Westralian Farmers Co-op., Ltd.	Bran, pollard, wheat meal, barley meal, buttermilk, flax meal, ground limestone, salt	15·0	3·0*	7·0	0·6	....	0·3	....	....
8.—*Horse Foods.*												
Horse Food	17	EVE-LYN	Tropical Traders & Patersons, Ltd.	Pollard, linseed (whole), wheat, salt, chalk, magnesium sulphate, sulphur, sulphate of iron, copper sulphate, sodium-bicarbonate, medicinal herbs	8·5	2·0*	7·0	6·5	1·0	1·75	Sulphur 2·5	....

9.—*Dog Foods.*												
No. 1 Dog Biscuits	29	SNAPS	A. E. Robinson	Wheat, bone, meat, vegetable	15·0	4·0*	2·0	0·7 0·4*	4·0 3·0*	4·5 3·5*	....	....
Plain Shapes	30	do.	do.	do. do. do.	15·0	4·0*	2·0	0·7 0·4*	4·0 3·0*	4·0 3·0*	....	....
Charcoal Shapes	31	do.	do.	Wheat, bone, meat, vegetable, charcoal	14·0	3·0*	6·0	0·7 0·4*	3·0 2·0*	3·0 2·0*	....	....
Puppy Meal	32	do.	do.	Wheat, bone, meat, vegetable	15·0	4·0*	2·0	0·6 0·3*	4·0 3·0*	4·5 3·5*	....	....
10.—*Miscellaneous.*												
Proto-lick	123	PROTO - LICK	Goldsbrough, Mort & Co., Ltd.	Sugar cane, molasses, and dried blood meal	17·0	....	....	....	0·5	0·4*	....	....
Lin Meal	124	WESTERN	David Gray & Co., Ltd.	Malt grains, linseed, peanut meal, yeast, bone meal	20·0	5·0*	5·0	1·5	1·5	1·0	....	....
C.—STOCK LICKS.										(Lime CaO)		
1.—*Bone Meals.*												
Sterilised Bone Flour	12	TRI-CALOS	Davis Gelatine (Aust.) Pty., Ltd.	Bones	5·0	....	....	....	30·0*	40·0*	....	....
Bone Meal	19	W.A.M.E.	West Australian Meat Export Works	do.	18·75	....	....	0·25	26·0*	27·0*	....	....
Do.	24	ANCHO	Anchorage Butchers Pty., Ltd.	Waste meat products	23·63	2·44*	....	....	26·76*	26·95*	....	....
N.A. Sterilised Bone Grit Meal	115	NEWCASTLE	W. Thomas & Co. (W.A.) Ltd.	Bones from animals slaughtered for human consumption	20·0	8·0*	1·0	0·2	20·0*	10·0*	....	....

Stock Food.	Reg. No.	Brand.	By whom Registered.	Materials from which Made.	Registered Analysis.							
					Crude Protein.	Sodium Chloride.	Phos. Acid (P_2O_5).	Lime (CaO).	Iron (Fe).	Copper (Cu).	Other.	
C.—STOCK LICKS—*continued.*					% (Min.)	% (Max.)	% (Min.)	% (Min.)	%	%	%	%
2.—*Mixed Stock Licks.*												
Denmark Lick Substitute	25	C.S.M.L.	Cuming Smith & Mt. Lyell F.F., Ltd.	Limonite, sulphate of copper, salt	....	38·0	....	....	20·0	0·14	....	....
Copper Lick	26	do.	do. do. do.	Di-calcic phosphate, copper sulphate, salt	....	66·0	12·5	....	....	0·1	....	....
Di-Calcic Lick	27	do.	do. do. do.	Di-calcic phosphate, salt, molasses	....	38·0	18·0	13·0	....	....	....	....
Di-Calcic Phosphate	28	do.	do. do. do.	Calcium phosphate at least 90% of the P_2O_5 being as di-calcic phosphate	....	....	37·0	28·0	....	....	....	....
					Magnesia						Sulphur	Potassium Iodide
Mineral Concentrate	38	VETSOLICK	A. H. McDonald & Co.	Magnesium sulphate, sodium bicarbonate, carbo-ligni, pollard, sulphate of iron, sulphur, potassium iodide, bone meal	0·7	....	11·0	14·0	1·5	....	16·6	0·5

* Minimum.

Stock Food.	Reg. No.	Brand.	By whom Registered.	Materials from which Made.	Registered Analysis.							
					Crude Protein.	Sodium Chloride.	Phos. Acid (P_2O_5).	Lime (CaO).	Iron (Fe).	Copper (Cu).	Other.	
					% (Min.)	% (Max.)	% (Min.)	% (Max.)	%	%	%	%
Medicated Lick	39	VETAMAC	A. H. McDonald & Co.	Salt, sulphate of iron, sodium bicarbonate, aloes, sulphur, magnesium sulphate, bone meal, molasses, potassium iodide	Magnesia Trace	53·0	5·7	7·5	0·7	....	4·0	Potassium Iodide 0·5
Coast Compound	40	do.	do. do. do.	Pollard, iron sulphate, sodium bicarbonate, sulphur, carboligni, cobalt cholride, copper sulphate, aniseed, molasses	....	....	....	....	Iron Sulph. 8·00	Copper Sulph. 1·60	12·5	Cobalt 0·28
Medicated Salt Block	82	BLUE PETER	Agricultural Products Co.	Common salt and other mineral ingredients supplying iron, magnesium, copper, manganese, cobalt, zinc, iodine, potash	....	70·0	1·3	6·0	1·5	....	....	Magnesium 7·50
Cobaltised and Copperised Concentrated Sheep Lick "D"	83	VITA-LICK	Goldsbrough, Mort & Co., Ltd.	Bone flour (degelatinised), bone charcoal, sodium sulphate (anhydrous), sulphur, limonite, potassium iodide, copper sulphate, cobalt chloride, and meals derived from the by-products of rice, cocoa, and wheat	Sodium Sulph. 1·8	....	23·5	30·0	1·3	....	2·0	....
Cobaltised and Copperised Sheep Lick Mixed "D"	84	do.	do. do. do.	do. do. do.	Sodium Sulph. 0·28	80·0	3·7	4·7	0·18	....	0·32	....
Cobaltised and Copperised Concentrated Sheep Lick "G"	85	do.	do. do. do.	Bone flour (degelatinised), bone charcoal, limonite, flowers of sulphur, potassium iodide, copper sulphate, cobalt chloride, and meals derived from the by-products of rice, cocoa, and wheat	....	....	23·5	31·0	3·52	....	4·0	....
Cobaltised and Copperised Sheep Lick Mixed "G"	86	do.	do. do. do.	do. do. do.	....	80·0	3·8	4·9	0·56	....	0·64	....

Cobaltised and Copperised Cattle Lick, Concentrated "D"	87	do.	do.	do.	do.	Bone flour (degelatinised), bone charcoal, sodium sulphate (anhydrous), flowers of sulphur, potassium iodide, copper sulphate, cobalt chloride, limonite, and rice, cocoa, and wheat meals	Sodium Sulph. 3·0	....	21·2	29·0	3·4	....	0·4	....
Cobaltised and Copperised Cattle Lick Mixed "D"	88	do.	do.	do.	do.	Bone flour (degelatinised), bone charcoal, sodium sulphate (anhydrous), flowers of sulphur, potassium iodide, copper sulphate, cobalt chloride, and rice cocoa, and wheat meals	Sodium Sulph. 0·6	75·0	4·2	5·4	0 ·64	Copper Sulph. 0·28	0·08	Cobalt Chloride 0·016
Cobaltised and Copperised Cattle Lick Mixed "G"	89	do.	do.	do.	do.	do. do. do.	....	75·0	4·4	5·8	0·88	Copper Sulph. 0·28	0·22	Cobalt Chloride 0·015
Cobaltised and Copperised Cattle Lick Concentrated "G"	90	do.	do.	do.	do.	Bone flour (degelatinised), bone charcoal, limonite (anhydrous), flowers of sulphur, potassium iodide, copper sulphate, cobalt chloride, and rice, cocoa, and wheat meals	....	....	24·50	31·00	4·70	....	1·15	....
Vita-Lick Mineral Mixture	92	V.M.M.	do.	do.	do.	Bone flour (degelatinised), bone charcoal, Spanish iron oxide, ferrous sulphate, flowers of sulphur, sodium sulphate (anhydrous), and meals derived from rice and cocoanut	Sodium Sulph. 2·6	4·3	9·5	12·5	0·47	....	1·4	....
Por-co-vite	93	POR-CO-VITE	do.	do.	do.	Bone flour (degelatinised), bone charcoal, sodium sulphate (anhydrous), flowers of sulphur, sodium chloride, limonite, calcium carbonate, copper sulphate, cobalt chloride, potassium iodide, cod liver oil	Sodium Sulph. 2·58	14·0	19·1	30·0	0·62	....	9·7	....
Chic-a-vite	94	CHIC-A-VITE	do.	do.	do.	Bone flour (degelatinised), bone charcoal, ferrous sulphate, flowers of sulphur, sodium sulphate (anhydrous), gentian, cod liver oil, potassium iodide, and meal derived from the by-product of rice	Sodium Sulph. 6·7	....	20·7	27·6	1·8	....	1·8	....

Stock Food.	Reg. No.	Brand.	By whom Registered.	Materials from which Made.	Registered Analysis.							
					Crude Protein.	Sodium Chloride.	Phos. Acid (P_2O_5).	Lime (CaO).	Iron (Fe).	Copper (Cu).	Other.	
					% (Min.)	% (Max.)	% (Min.)	% (Max.)	%	%	%	%
Stock Lick	120	WESFARMERS	Westralian Farmers Co-op., Ltd.	Salt, calcium carbonate, bone meal, bluestone, cobalt chloride, manganese sulphate, iron sulphate	....	80·0	0·85	8·4	0·17	0·12	Manganese 0·012	Cobalt 0·02
Di Calcic Lick	121	do.	do. do. do.	Salt, di calcic phosphate	....	60·0	15·0	11·0	....	....	....	....
Denmark Lick Substitute	122	do.	do. do. do.	Limonite, salt, copper sulphate	....	65·0	....	....	10·0	0·15	....	....
Cattle Lick	133	DAVID GRAY'S	David Gray & Co., Ltd.	Bone meal, common salt, yeast, minerals in the form of $FeSO_4$, $CuSO_4$, $CoCl_2$, $MnSO_4$, KI	....	80·0	1·0	5·0	FeO 1·5	....	....	....
Sheep Lick	134	do.	do. do. do.	do. do. do.	....	80·0	1·0	5·0	FeO 1·5	....	....	....